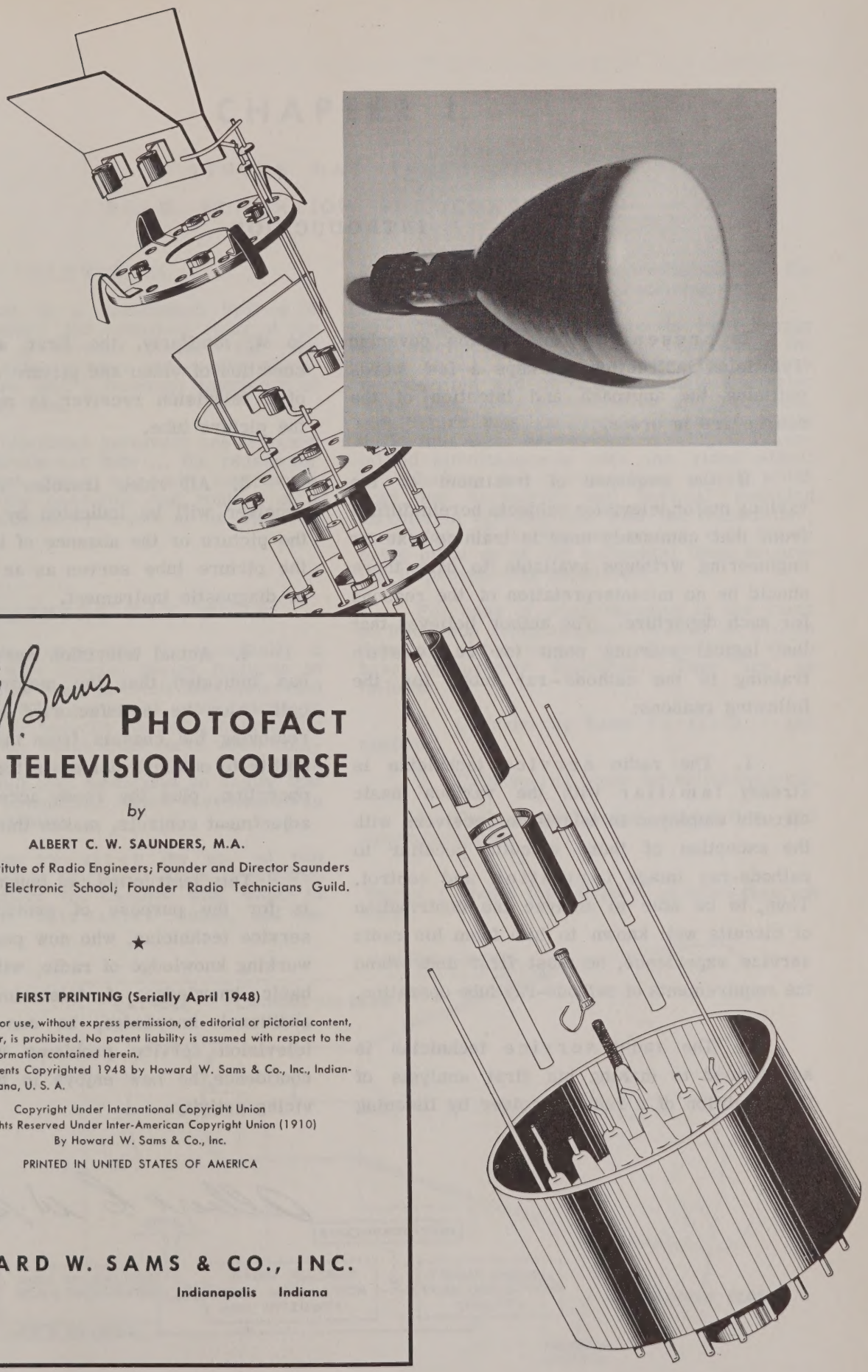
CONTENTS

TRADE NAME	MODEL	FOLDER NO.
TELEVISION COURSE—INSTALLMENT No. 1		
Airline	84WG-2015A	488-1
Crosley	58TW	488-2
Crosley	88TA, 88TC	488-3
Delco	R-1238	488-4
Dewald	B-506	488-5
Firestone (Air Chief)	4-A-60 (Code No. 307-8-9047A)	488-6
Garod	11FMP	488-7
Knight	93-191	488-8
Magic Tone	508 (Keg Radio), 900 (Keg Lamp Radio)	488-9
Mantola	R-75152	488-10
Meck	CR-500	488-11
Milwaukee	Record Changer 11200	488-29
Motorola	408	488-12
Philco	CR-8	488-13
Philco	48-360	488-14
Philco	48-461	488-15
Philharmonic	100C	488-16
RCA (Victor)	77U (Ch. RC-1057A)	488-17
RCA (Victor)	77V1 (Ch. RC-615)	488-18
Regal	1500	488-19
Sentinel	314-E, 314-I, 314-W, IU-314E, IU-314I, IU-314W	488-21
Silvertone	7350 (Ch. 435.410)	488-22
Sparton	100, 101, 102, 103, 104, (Ch. 5-A7)	488-23
Stewart-Warner	9002-A, 9002-B, 9002-P, 9002-R	488-24
Tele-Tone	150, 161, 162, 167, 168, 171, 174 (Ch. Series "T")	488-25
Tele-Tone	159 (Ch. Series "AA")	488-26
Temple	G-724	488-27
Truetone	D-2851	488-28



Howard W. Sams

PHOTOFACT TELEVISION COURSE

by

ALBERT C. W. SAUNDERS, M.A.

Member Institute of Radio Engineers; Founder and Director Saunders Radio and Electronic School; Founder Radio Technicians Guild.

★

FIRST PRINTING (Serially April 1948)

Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein.

Entire Contents Copyrighted 1948 by Howard W. Sams & Co., Inc., Indianapolis 7, Indiana, U. S. A.

Copyright Under International Copyright Union
All Rights Reserved Under Inter-American Copyright Union (1910)
By Howard W. Sams & Co., Inc.

PRINTED IN UNITED STATES OF AMERICA

HOWARD W. SAMS & CO., INC.

Indianapolis Indiana

INTRODUCTION

In presenting this series covering Television instruction, perhaps a few words outlining the approach and intention of the course are in order.

If the sequence of treatment of the various major television subjects herein differs from that commonly used in training texts or engineering writeups available to date, there should be no misinterpretation of the reasons for such departure. The author believes that the logical starting point for television training is the cathode-ray tube, for the following reasons:

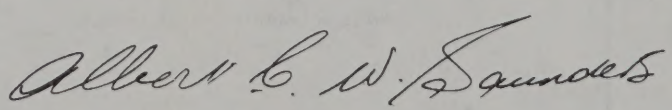
1. The radio service technician is already familiar with the various basic circuits employed in television receivers with the exception of those circuits peculiar to cathode-ray image formation and control. Thus, to be able to analyze the contribution of circuits well known to him from his radio service experience, he must first understand the requirements of cathode-ray tube operation.

2. The radio service technician is accustomed to making his first analysis of the condition of a radio receiver by listening to it; similarly, the first analysis of the condition of video and picture control portions of a television receiver is made by viewing the picture tube.

3. All video troubles in a television receiver will be indicated by the quality of the picture or the absence of it. In this way, the picture tube serves as an important test or diagnostic instrument.

4. Actual television service experience has indicated that the majority of service calls can be satisfactorily handled without removing the chassis from the cabinet. The ability to obtain a diagnosis from picture tube operation, plus the ready accessibility of the adjustment controls, makes this possible.

This instruction, as taught in my school, is for the purpose of providing the radio service technician, who now possesses a good working knowledge of radio, with an equivalent basic knowledge of television. With this additional knowledge, he can approach his television service problems with the same confidence he now enjoys in his radio servicing activity.



CHAPTER I

CATHODE RAY TUBES -- BEAM FORMATION AND CONTROL

TELEVISION

Television is a specialized branch of the radio industry and requires study of the various types of circuits utilized for the production of high voltages and special wave-shapes, together with a thorough knowledge of the cathode-ray tube.

Modern television receivers are designed around the cathode-ray tube ... the reason for this being that every circuit contributes ultimately to the operation and control of a cathode-ray, commonly known as an electron beam.

THE CATHODE-RAY TUBE

The cathode-ray tube is essentially a vacuum tube with special design features to produce a narrow beam of electrons accelerated by a large positive potential, and caused to move at a high velocity toward a chemically prepared screen which fluoresces when bombarded by high speed electrons. The beam can be deflected and modulated so easily that it has many properties which are desired in the art of television.

Television requires the use of two distinctly different functional types of cathode-ray tubes; namely, the Camera tube which is located in the television studio, and the Picture tube for the reproduction of the transmitted picture at the receiving end.

The Camera tube converts light energy into electrical energy which represents the video signal. This signal from the camera is amplified and used to modulate a carrier wave; then, after transmission and reception, the Picture tube reconverts the video signal back into light energy for viewing. Transmitted simultaneously with the video signal are blanking and synchronizing pulses which hold the horizontal and vertical scanning circuits in synchronism with the transmitter, to produce 30 frames per second, each frame being made up of 525 horizontal lines, according to present-day standards.

For ease of comprehension in the study of television reception, the receiver is broken down into three major circuit sections which have independent functions. They are as follows:

1. Cathode-ray beam formation and control.

2. Cathode-ray beam deflection systems.

3. Cathode-ray beam modulation and synchronization.

Figure 1 shows this division in block diagram form.

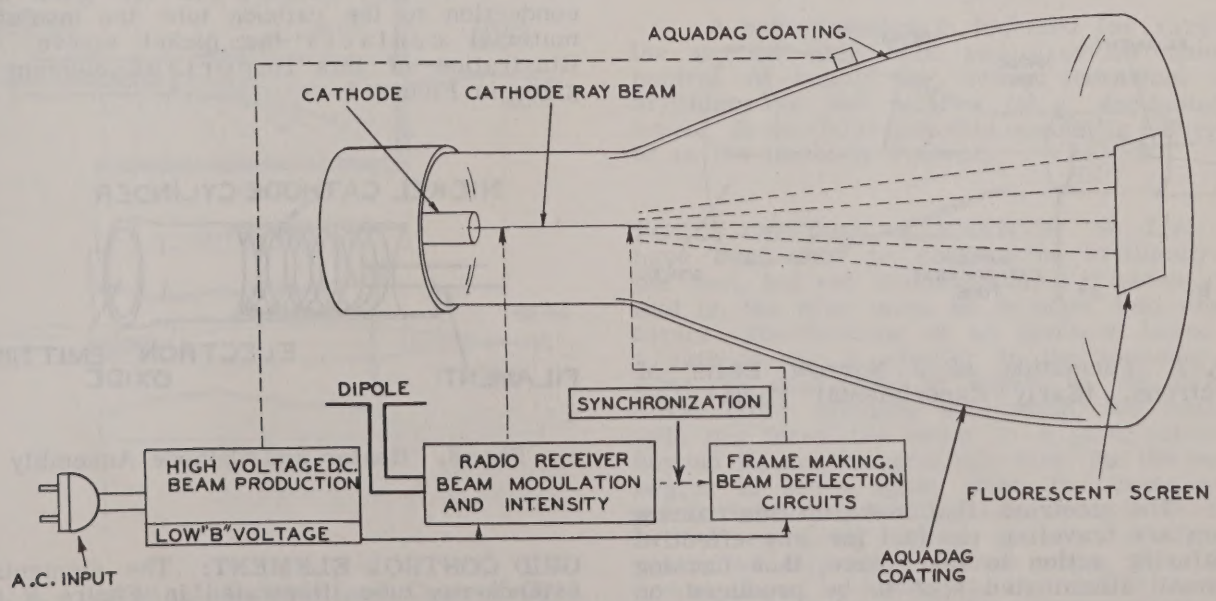


Fig. 1. Radio Plus Video Creates Television.

These three master subjects serve as a guide of what to study, and how to study, and are in the correct sequence to afford the reader a clear understanding of what takes place in a television receiver.

BEAM FORMATION AND CONTROL: Involves the study of high potentials, testing techniques, the cathode-ray tube and electron optics.

BEAM DEFLECTION SYSTEMS: Involves the study of blocking oscillators, free-running multivibrators and wave-shaping circuits.

BEAM MODULATION and SYNCHRONIZATION: Involves the study of high frequency broadband receivers, video detectors, video amplifiers, and D.C. restorers. The reader is advised to thoroughly grasp one subject at a time to prevent confusion and disappointment. The study will not be difficult if this simple rule is followed.

BEAM FORMATION AND CONTROL

Figure 2 shows a simple cathode-ray tube used in early experiments to develop a narrow beam of electrons. Emitted from a hot filament, the electrons proceed forward under the attraction of a positively charged plate. Accelerated by this positive charge, the beam reaches a velocity of many thousand miles per second, depending upon the force of this attraction. The equal negative charges carried by each electron tend to set up a repelling action that causes the emitted beam to widen or scatter. However, the small hole in the center of the anode narrows the beam and permits some of the fast-moving electrons to proceed to the end of the tube without appreciable loss of velocity.

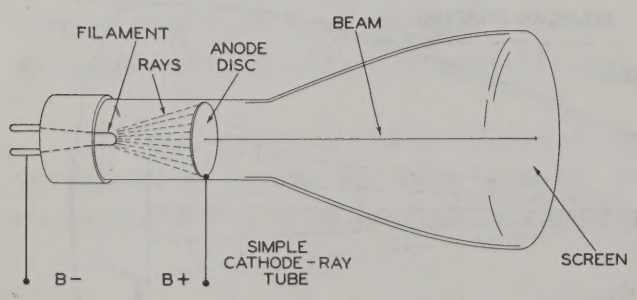


Fig. 2. Formation of a Narrow Beam of Electrons. (Early Experimental Form)

The electrons that make up this narrow beam are traveling too fast for any effective scattering action to take place, thus causing a small illuminated spot to be produced on the fluorescent screen. In the process of narrowing the beam, the electrons that scatter are collected by the positively charged anode, causing a current to flow through the "B" supply circuit. This type of cathode-ray tube is very elementary, but serves adequately to facilitate a discussion on the production and formation of a narrow beam of electrons which will strike a fluorescent screen developing a spot of light. The color of the spot depends upon the type of chemical used on the screen. For further information regarding the chemicals in common use for this purpose, reference should be made to the table which will appear later in the text.

Cathode-ray tubes used in television are fundamentally comprised of the following: (1) An electron beam source; (2) A fluorescent screen for visible indication; (3) A provision for varying the intensity, which controls the brilliancy of the spot; (4) A provision for focusing the beam on the screen, which controls the size of the spot, and (5) A provision for deflecting the beam, which controls the position of the spot on the screen.

In modern cathode-ray tubes, the electron source is an indirectly heated cathode or electron emitter, which is a small cylinder of nickel about one-eighth of an inch in diameter and about one-half inch long. This nickel sleeve is coated on one end with oxide, which permits a copious number of electrons to be emitted in the direction of the fluorescent screen. The heater is a tungsten wire filament, wound to form a non-inductive spiral, which tends to cancel any magnetic field that might affect the electron beam. The filament coil is insulated and inserted into the cathode sleeve, and for good heat conduction to the cathode tube the insulating material contacts the nickel sleeve. An illustration of this important element is given in Figure 3.

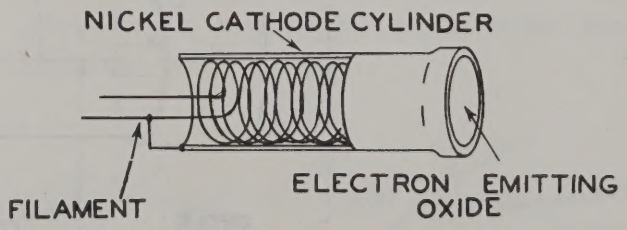


Fig. 3. Heater and Cathode Assembly

GRID CONTROL ELEMENT: The elementary cathode-ray tube illustrated in Figure 2 has no controlling element which can limit the

number of electrons emitted from the cathode. In television, some means must be provided for controlling the brilliancy of the picture. This calls for an additional element, designated as the control grid, to be inserted between the cathode and the positively charged anode. In modern tubes, this element is a metal cylinder completely enclosing the cathode element, as illustrated in Figure 4A. The strategic position of the control grid element constitutes a means of controlling the quantity of electrons admitted into the beam. This, in turn, limits the number of electrons impinging on the screen; hence the brilliancy of the pattern, because the more negative the control grid is biased with respect to the cathode, the fewer electrons in the beam, and the less the intensity of light produced on the screen. The direction of the electron emission is governed by an aperture in the disc at the end of the grid cylinder.

The lines of force of the electrostatic field developed by the difference of potential between the two elements, that is, cathode and control grid, and their effect on the beam, are illustrated in Figure 4B.

If the voltage on the control grid is made more negative with respect to the cathode, fewer electrons will be admitted to the beam. If the control grid is sufficiently negative, it will completely shut off or blank out the beam.

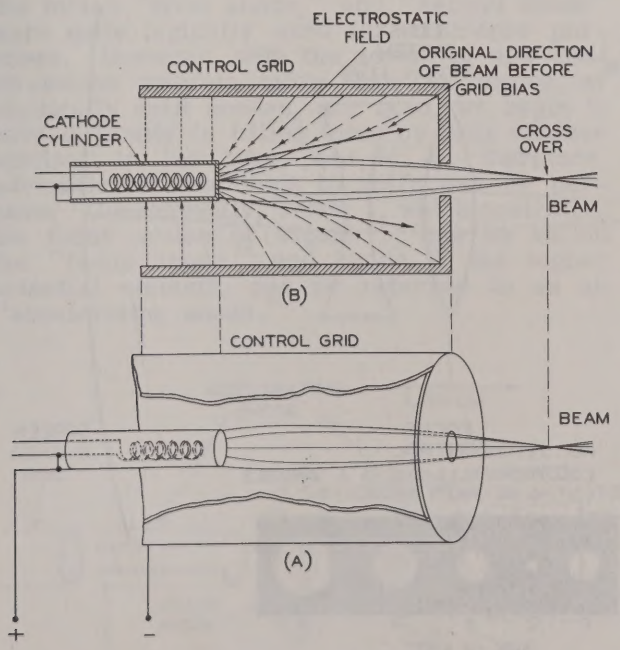


Fig. 4. Action of Cathode and Control Grid Assembly.

In earlier cathode-ray gun construction, the negative field of the control grid also lessened the effect of the positively charged focus anode located immediately beyond the control grid and further contributed to the reduction of the beam. Many present production cathode-ray tubes employ a different physical placement of the anodes to reduce this inter-action of control grid (brilliance) and focus adjustments. A complete discussion of anode function and structure is given later in this text.

Also, the action of the negative field associated with the control grid causes the beam to have a cross-over point after it passes through the control grid aperture; refer to illustration 4B.

This cross-over action is similar to a lens and concentrates the beam of electrons to a fine point. Hence, the phrase "electron optics." A close resemblance is given in Figure 5.

Summing up the foregoing, the control grid has three functions:

1. Controls brilliancy at the cathode-ray screen from zero to maximum.
2. Lens action to concentrate the beam by effecting a cross-over.
3. Provides a means for inserting the video output from a television receiver.

A potentiometer is included for varying the control grid bias and provides manual control to enable the viewer to adjust the brilliancy of the picture to a comfortable level. In oscillography this control is referred to as the intensity control.

FOCUS CONTROL ELEMENTS: So far, we have been able to control the brilliancy of the spot, but yet another control is necessary; that is, the spot must be brought into sharp focus. The focusing of an electron beam in a cathode-ray is similar to the focusing of light, as illustrated in Figure 6. As understood from previous discussion, the control grid did focus the beam to a point slightly beyond its (control grid) aperture, but the beam begins to widen again after the cross-over point; therefore, additional focusing is needed. In the earlier types of electrostatically controlled television picture tubes, this was accomplished by having two cylindrical anodes, as illustrated in Figure 5.

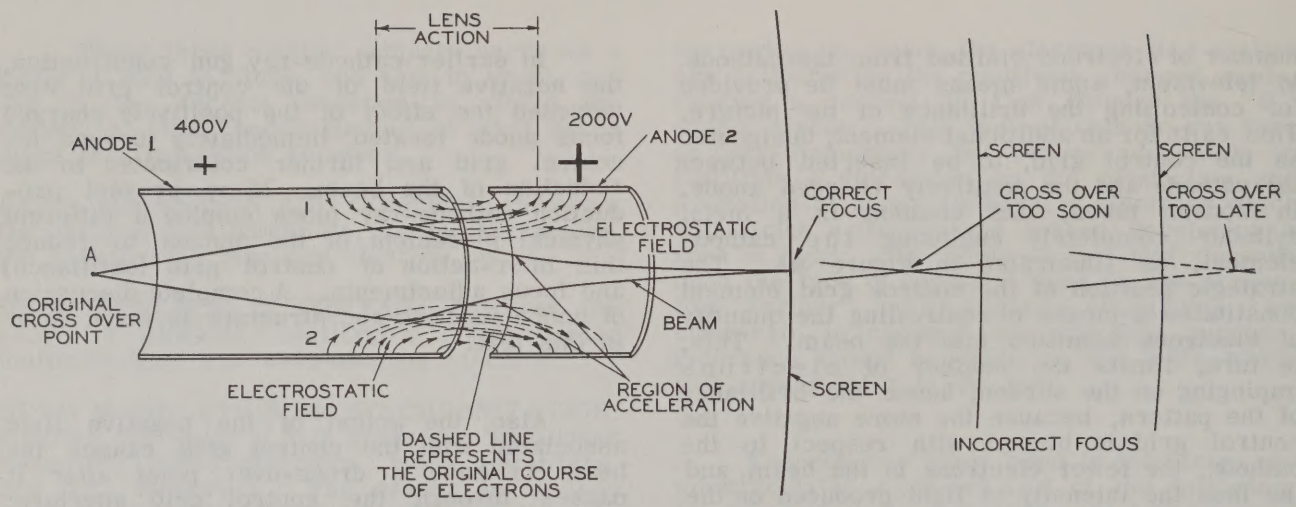


Fig. 5. Effect of an Electrostatic Field on an Electron Beam

The two anodes are operated at different potentials and the lines of force developed between the two elements establish the lens action in the following manner. The moving electrons will be subjected to forces as they enter the electrostatic field set up by Anode 1 and Anode 2. To understand clearly what takes place, let us refer to Figure 5. Here, the electron beam is seen entering the electrostatic field developed by a difference of potential existing between the two anodes. Coming from point "A," the original cross-over, the beam enters a new field. As the electrons cross the first static lines (1) and (2), Figure 5, the tendency is to change their course because the forces acting on them are repelling to negative charges due to the potential gradient existing between anodes 1 and 2. Although both anodes are positive with respect to the cathode, anode 1, operating at a much lower potential, is negative with respect to anode 2, creating an electrostatic field which tends to repel the electrons entering that field.

The electrons, traveling at a high speed, are gradually bent into a beam, the greatest repelling force occurring at a point somewhere between the two anodes. When the electrons of the beam converge near the axis of the tube (center), where the lines of force are running almost parallel to the axis, an

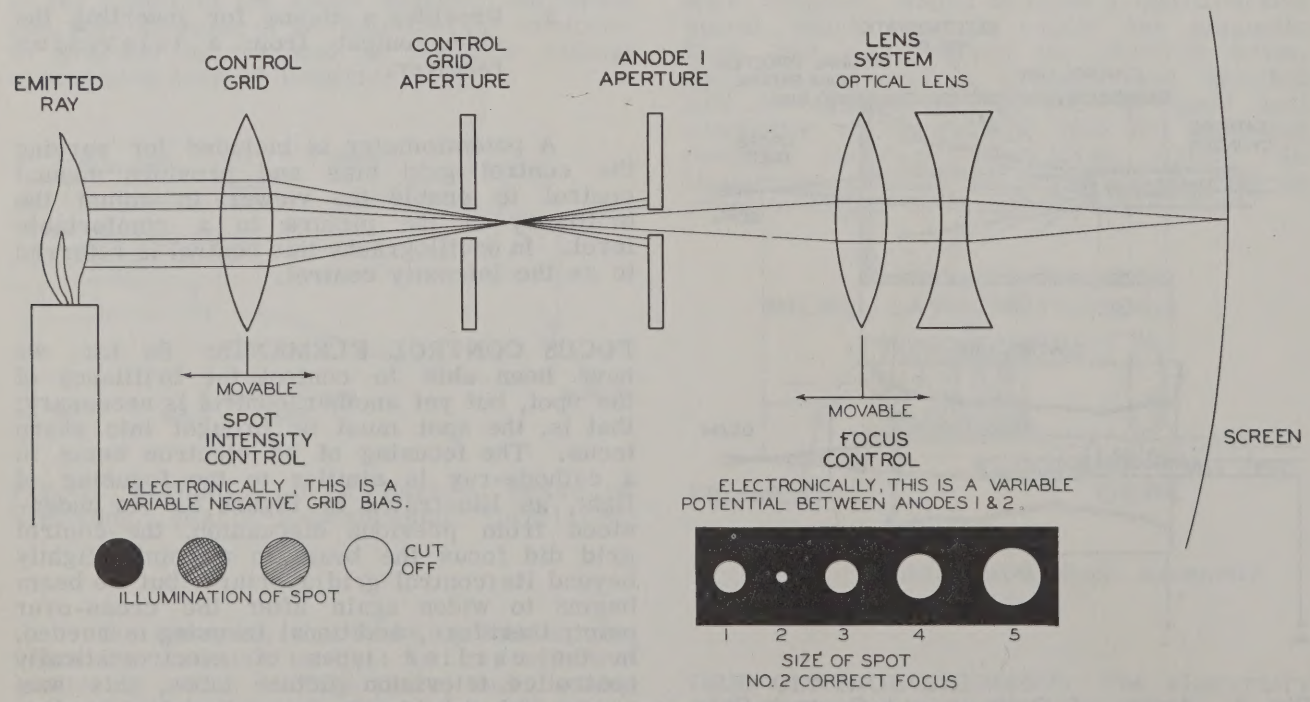


Fig. 6. Similarity of Light Ray and Cathode Ray

acceleration takes place and the electrons in the beam gain velocity. At the end of anode 2, the field is relatively weak and the electrons keep their direct course, aided by the velocity gained while traveling through anode 2. In this construction, the two anode cylinders are similar to the grid cylinder, with the exception of anode 1, which is generally longer and has two aperture discs spaced to provide better focus action.

After the beam has passed through anode 2, a second cross-over point takes place. This second cross-over point should be adjusted so that it takes place when the beam arrives at the surface of the screen.

The focus of an electrostatic type cathode-ray tube, construction of which is shown in Figure 5, is generally adjusted by varying the voltage applied to anode 1. This controls the amount of force the electrostatic field exerts on the electron beam, and by rotating the focus control and observing the screen, it is very easy to bring the beam into sharp focus.

Before proceeding into a discussion of variations in anode structure from the type just discussed and illustrated in Figure 5, it might be wise to clarify the terminology existing at present with regard to these elements.

Since the first cathode-ray tubes employed in television corresponded to the two cylindrical anode type illustrated in Figure 5, the terms "first anode," and "second anode" were quite logically used for reference purposes. However, with the advent of new constructions wherein more than two anodes, or physically split anodes, are used, we begin to have difficulty in titling them by their relative position in the tube, and it is, therefore, advisable to label them by their use or purpose. Consequently, anode 1, which controlled the focus action of Figure 5, can be called the "focus anode," and anode 2, the higher potential element, can be referred to as an "accelerating anode."

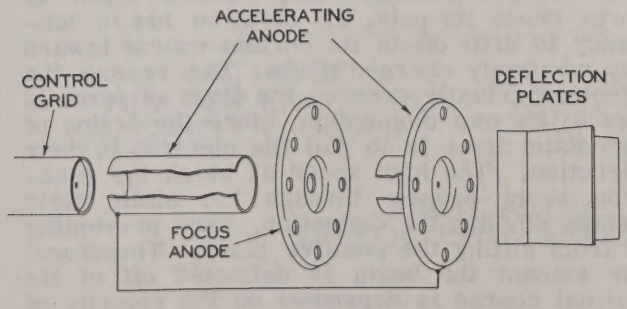


Fig. 7. Typical Anode Assembly

Figure 7 shows a more recent form of cathode-ray anode assembly in a typical 7-inch electrostatic tube. As noted in the illustration, the cylindrical anode adjacent to the control grid is an accelerating anode instead of a focus anode as employed in Figure 5. The circular disc with the rather large aperture, following the accelerating anode, is actually the focus anode. The shorter cylindrical anode combined with the second circular disc is electrically connected to the first cylindrical anode and is considered part of the accelerating anode structure. The reasons for this construction are as follows:

1. Removal of the focusing anode from its position near the control grid lessens any inter-action between intensity and focus control adjustments.

2. By proper placement of the focusing anode, it is possible to make its aperture larger and thereby reduce the amount of beam current drawn by this anode, lessening its effect on the beam intensity.

3. Item 2 is made possible because of the separation of portions of the accelerating anode, enabling the insertion of the focusing anode.

4. In any cathode-ray tubes which employ appreciable focusing anode current, the focusing control circuits must use sufficient bleed current to insure reliable operation. With the construction outlined in Figure 7, it is possible to considerably reduce or eliminate the requirement for bleed currents.

It should be borne in mind that construction of the tubes may vary according to the manufacturers' preferences of electrical design and physical support of the various elements.

Summing up, the focus and accelerating anodes have two functions:

1. Focusing the beam for sharp detail of the image on the screen. The focusing is manually controlled.

2. Acceleration of the beam.

GENERAL SUMMATION TO THIS POINT: The cathode-ray tube requires a high potential between the cathode and the accelerating anode. The voltage of the focus anode is usually around one-fifth that of the accelerating anode, and is normally variable to provide a means of focusing. The bias supply to the control grid also is made variable to provide a means of controlling the brilliance.

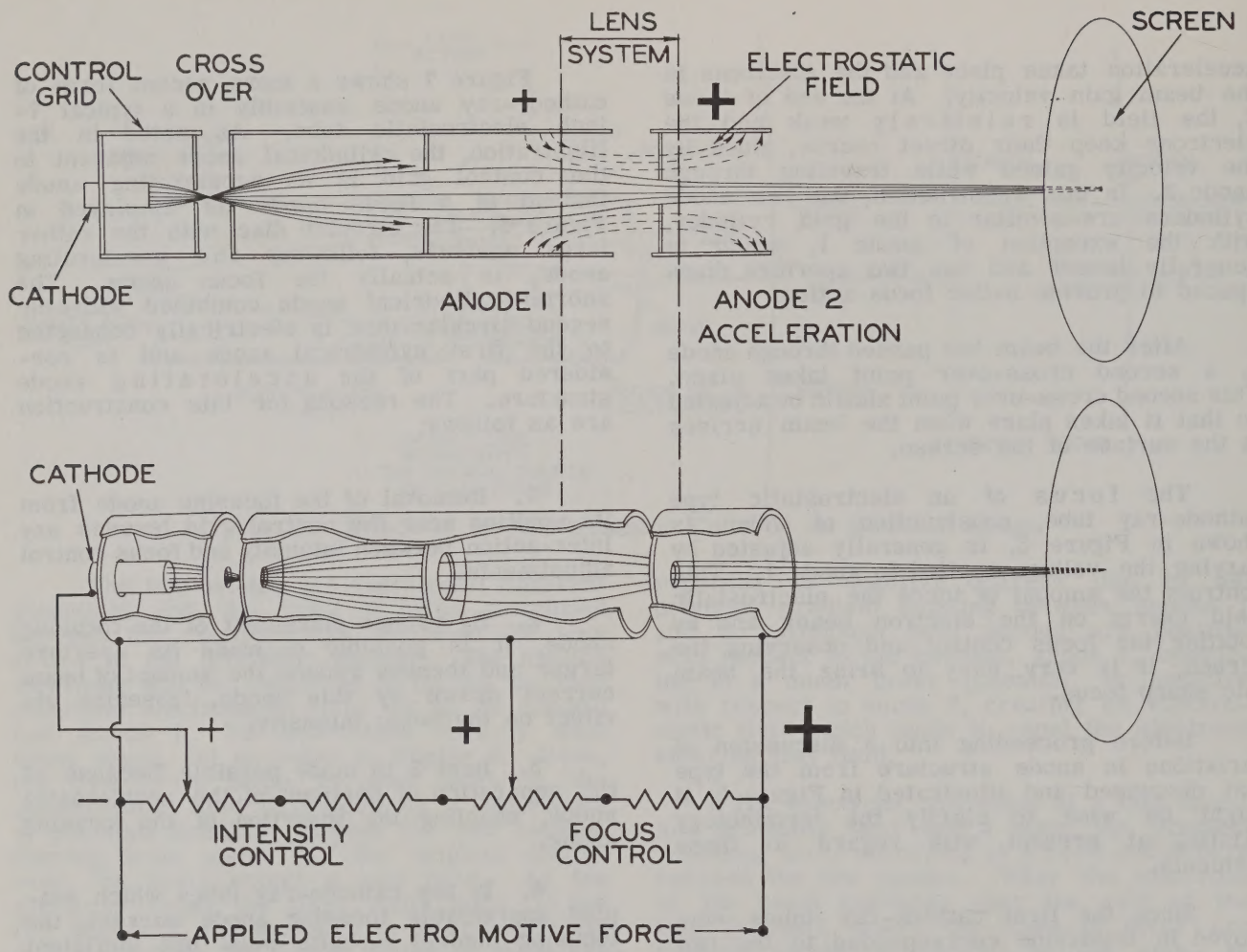


Fig. 8. Electron Gun Assembly

The assembly so far discussed constitutes the electron gun, so called because it shoots bullets (negative particles) to a screen or target. Figure 8 shows a typical electron gun assembly.

BEAM DEFLECTION

ELECTROSTATIC: Now that we have produced and accelerated the beam and are able to manually control its intensity and focus, a means must be provided to give it universal motion of deflection; that is, a horizontal and verticle movement within the area of the fluorescent screen. To obtain this effect, two sets of deflecting plates, with horizontal and vertical orientation (see Figure 9), are mounted in the neck of the tube and so arranged that the electron beam passes between the plates of each pair, after it has sped through the anode structure toward the screen. The complete assembly of a cathode ray tube with deflection electrostatically controlled is illustrated in Figure 10.

Since the electrons in the beam are negatively charged, their movement will be governed by the basic law of attraction and repulsion; that is, "like charges repel one another, unlike charges attract one another." Therefore, a positively charged plate will attract, while a negatively charged plate will repel.

An electrostatic field exists between two adjacent plates of opposite polarity. Referring again to Figure 9, when an electron is shot into an electrostatic field whose lines of force cross its path, the electron has a tendency to drift off of its normal course toward the positively charged plate. The reason the electron actually crosses the lines of force is due to its own momentum, since the action of the static lines is to pull the electron in their direction. The high speed at which the electron beam passes through the static field delays slightly its deflection, thus preventing it from hitting the positive plate. Therefore, the amount the beam is deflected off of its normal course is dependent on the velocity of the beam and the strength of the deflecting field. The horizontal and vertical deflection

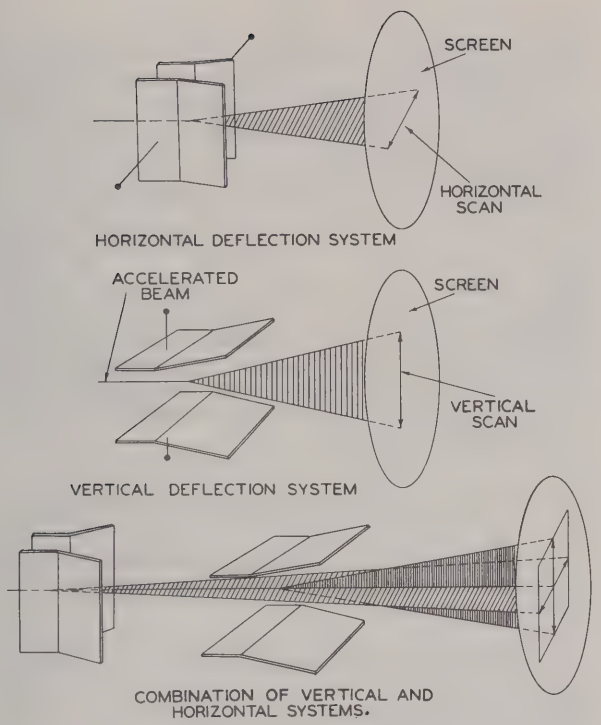


Fig. 9. Electrostatic Beam Deflection Systems

could be increased by increasing the distance between the point of deflection and the screen; this, of course, would increase the physical length of the cathode-ray tube. It will be noted in some specifications that the sensitivity of the horizontal deflection plates is greater than that of the vertical, since the horizontal plates are further from the screen. However, when a cathode-ray tube is designed, the velocity of the beam and the position of the electrodes is fixed; therefore, to increase the deflection, the deflecting voltage must be increased.

The distance the beam or spot is moved across the screen by an applied voltage of one volt across the deflection plates, is called the deflection sensitivity.

Another way of increasing the deflection sensitivity is to increase the length of the deflection plates so that the static field is active on the beam for a longer period of time. In this case it will be necessary to bend the ends of the plates to form a flare; see Figure 9.

EFFECT OF A FAST MOVING LIGHT SPOT ON THE FLUORESCENT SCREEN

The capability of the human eye to retain an image is about 1/16 of a second after it disappears. This is indicated by the practice followed in the projection of motion pictures where a series of still pictures is projected on the screen, in such rapid succession that the eye cannot detect them as separate pictures. In a cathode-ray tube the beam is swept so fast that the moving spot appears as a straight line. If the beam is swept over the same line

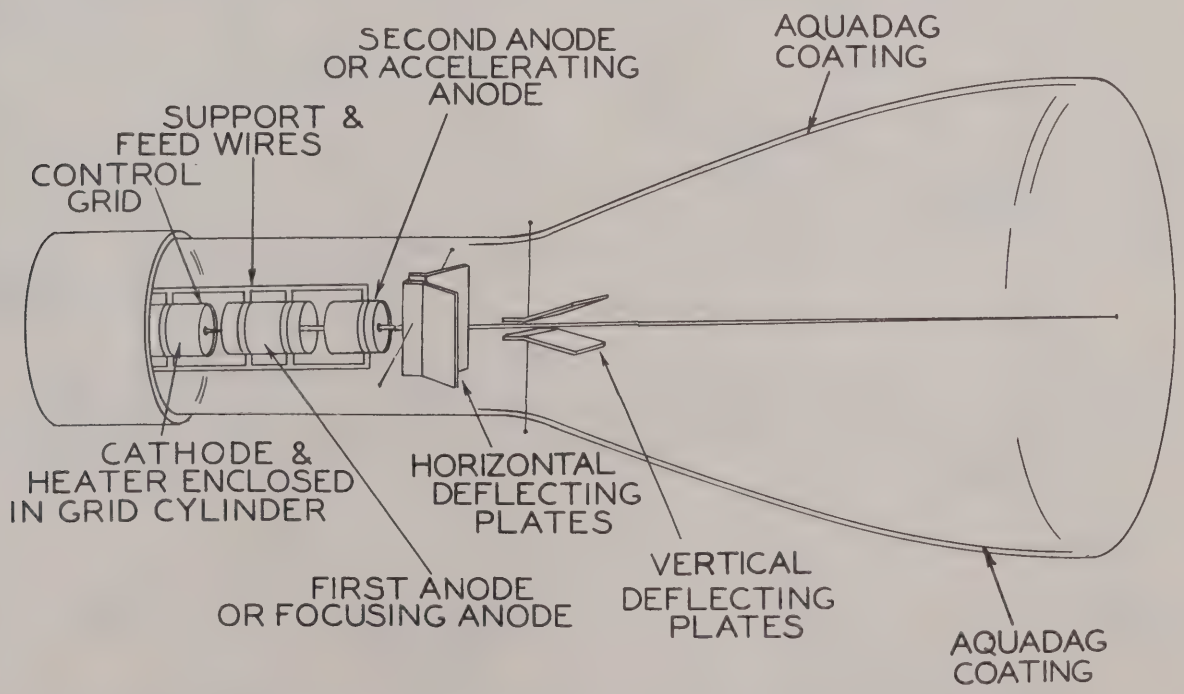


Fig. 10. Electrostatic Focus and Deflection

or path at least 16 times a second, the spot appears to the viewer as a continuous line of light, without flicker. Therefore, if the combined action of the horizontal and vertical deflection voltages sweeps the beam horizontally and vertically at the same time, a frame of light will appear on the screen. See Figure 9. The summation is as follows:

A small spot of light appears at the point where the electron beam strikes the screen. If the beam is deflected left to right and top to bottom very rapidly, the whole screen is illuminated. In television, this pattern of light is called a raster.

In early cathode-ray tube practice, deflection voltage was obtained from single-ended amplifiers. One plate of each set of deflection plates was tied together and, in turn, connected to the accelerating anode. When a deflection voltage was applied to the deflection plates a difference of potential existed between the accelerating anode and deflection plates causing a defocusing action and change in velocity of the beam. This effect is called astigmatism.

In present construction of cathode-ray tubes, separate terminals are provided for each deflection plate, making possible the use of push-pull deflection amplifiers. The average potential remains constant between the plates of either pair of plates, since the potential of one plate is increased by an amount equal to the decrease in potential of the other plate. This minimizes any defocus action or change in velocity of the beam. Some tubes also have a ring or element placed between the horizontal and vertical deflection plates and connected to the accelerating anode. Its purpose is to prevent the defocusing action which would be the result of any disturbing field set up between the pairs of deflecting plates.

Summation at this point is as follows:

1. We have finally produced a frame of light, the intensity of which can be controlled.

2. Knowing that the frame is built up of small spots of light, it is now possible to insert into the control grid circuit of the

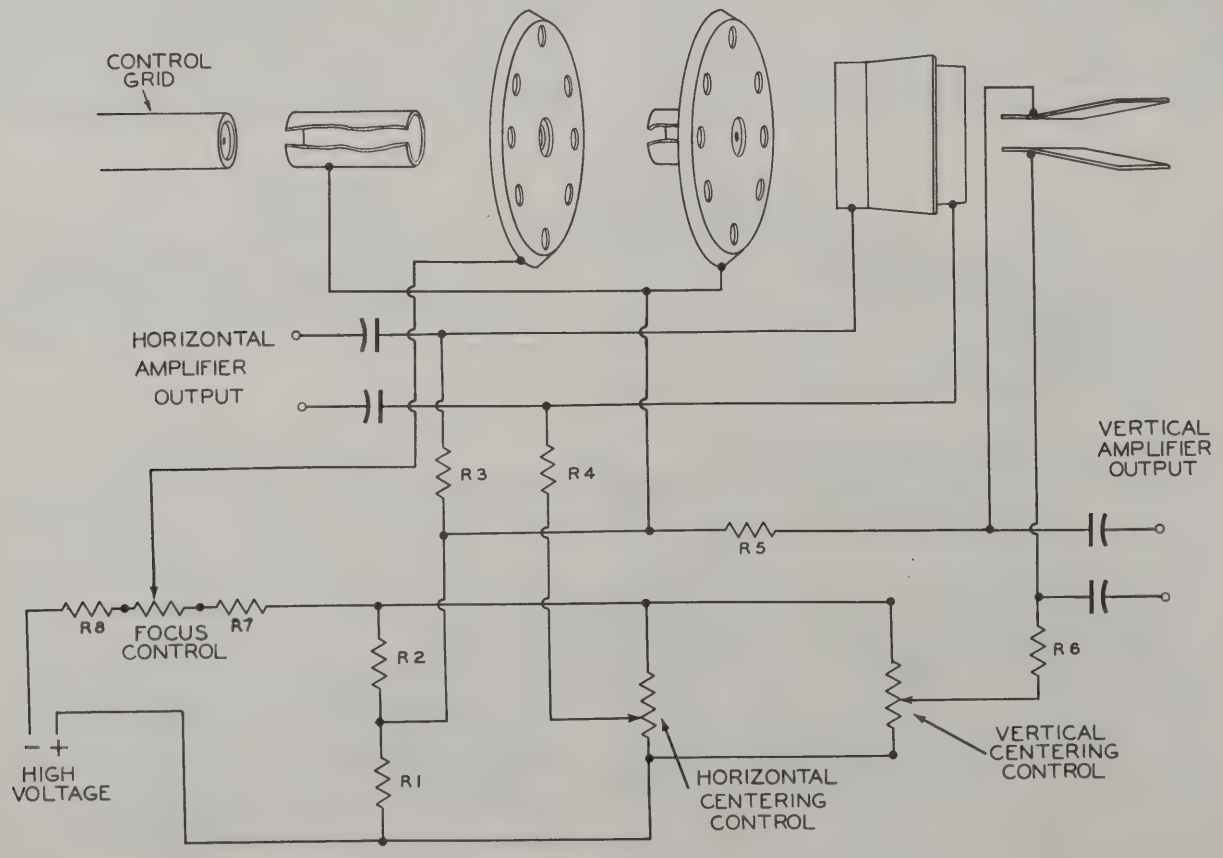


Fig. 11. Typical Centering Control Circuit

cathode-ray tube, a video signal that will modulate the beam, causing each spot to vary in brilliancy. An analogy of this action may be obtained by looking at a picture in a newspaper under a magnifying glass. It can be seen plainly that each small dot varying from black to white, through various shades of grey, produces the necessary elements to form a picture.

CENTERING CONTROLS: There is an additional control function required to insure proper operation of the cathode-ray tube as used in television applications.

For correct operation, the cathode-ray electron beam, in the absence of deflection potentials, should strike in the center of the fluorescent screen. Effects such as stray electric and/or magnetic fields, distortion of forces within the cathode-ray tube itself, and aging or replacement of the tube or its associated supply components may cause the beam to move off center. To correct any "off center" condition that may exist, two centering controls are generally made available on the back apron of the receiver chassis to enable the serviceman to adjust the picture frame for proper horizontal and vertical positioning.

Figure 11 illustrates a typical centering control system. A high positive potential is applied across the divider network consisting of R1, R2, R7, the focus control, and R8. From the junction of R1 and R2, potentials are applied to the accelerating anode, through R3 to one horizontal plate, and through R5 to one vertical plate. As shown in the illustration, each of the centering controls parallels the combination of R1 and R2. The variable arm of the horizontal centering control supplies the remaining horizontal deflection plate through R4, and, similarly, the variable arm of the vertical centering control supplies the remaining vertical deflection plate through R6.

When the variable arms of the centering controls are at their mid-point, no DC potential exists between the individual plates of each pair of plates.

Consider for a moment the horizontal plates. A simplified diagram of their supply circuit is shown in Figure 12.

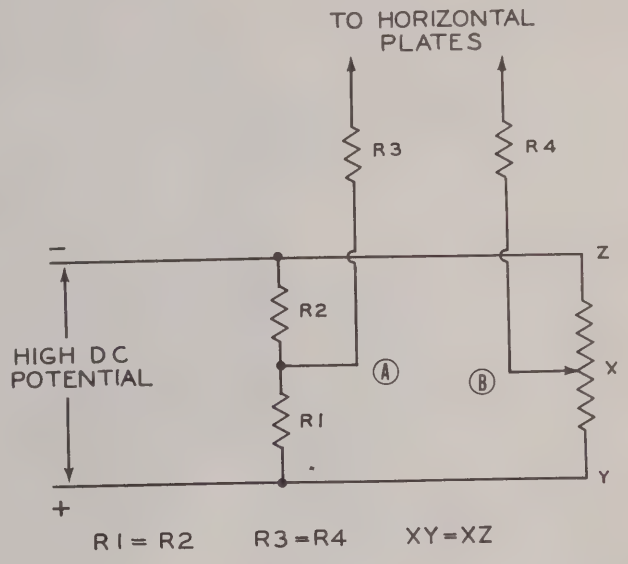
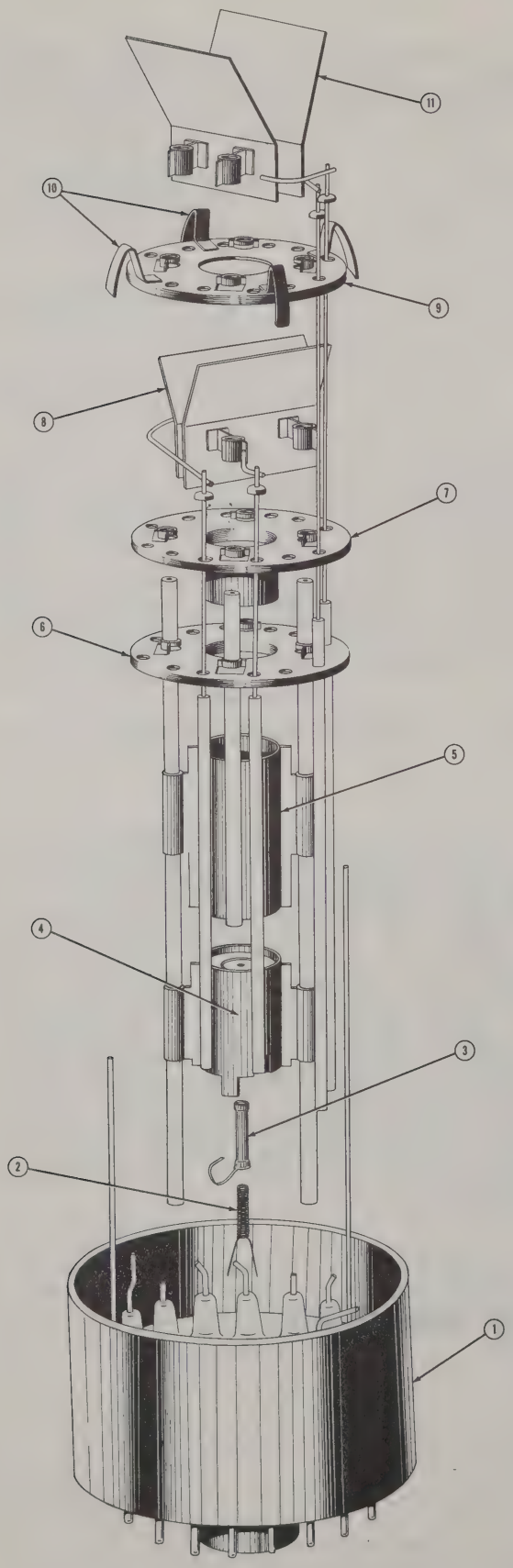


Fig. 12. Simplified Beam Centering Circuit

Since R1 is equal to R2, and XY is equal to XZ when the centering control is at mid-point, we have, in effect, a bridge circuit and no potential will exist between the arms of this bridge represented by points A and B in Figure 12. It will be seen that one horizontal plate is supplied by each bridge arm through the series resistors R3 and R4, which are equal in value. Thus, it is possible to maintain a condition of no DC potential between these plates. Should an "off-center" electron beam be encountered, due to any one or a combination of the effects mentioned previously, the beam may be centered by moving the control arm to provide a counteracting DC potential.

By applying the above analysis to the vertical centering supply circuit, it will be seen that an identical method of control is used.

The next installment will concern the study of electromagnetic deflection systems.



TYPICAL 7 INCH CATHODE-RAY TUBE STRUCTURE USING ELECTROSTATIC DEFLECTION

1. Medium Shell Diheptal Base. (Designation 14-G)
2. Heater Element
3. Cathode Sleeve
4. Control Grid
5. Accelerating Anode
6. Focus Anode
7. Accelerating Anode
8. Horizontal Deflection Plates
9. Barrier Anode
10. Support and Aquadag Contact Springs
11. Vertical Deflection Plates

Sample Tube Structure Courtesy of
SYLVANIA ELECTRIC PRODUCTS, INC.

A PHOTOFACT "Exploded" View
© HOWARD W. SAMS & CO., INC., 1948

AIRLINE MODEL
84WG-2015A

AIRLINE MODEL
84WG-2015A

AIRLINE MODEL 84WG-2015A

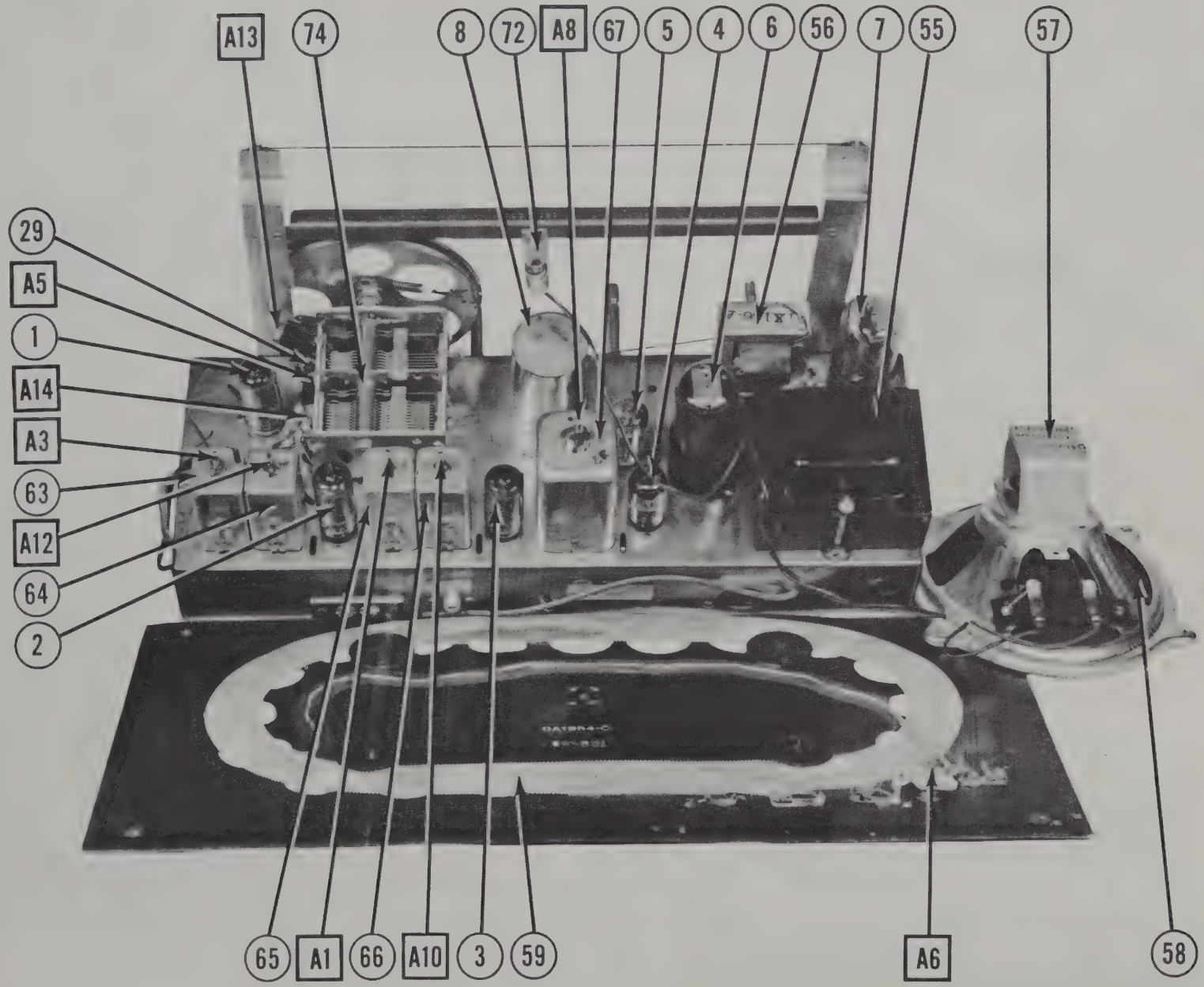
TRADE NAME	Airline, Model 84WG-2015A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	AC Operated Combination Phono-Radio AM-FM Superheterodyne Receiver
TUBES (SEVEN)	Types, 6BE6 Converter, 6BA6 1st IF Amp., 6BA6 2nd IF Amp., 6AL5 Ratio Detector, 6AV6 Det.-AVC-AF, 6V6GT Power Output, 6X5GT Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	.29 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1600KC FREQ. MOD. 88-108MC

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove FM and AM antenna leads from loop antenna.
3. Remove phono-motor plug from chassis.
4. Remove phono-pickup plug from chassis.
5. Remove four snap buttons holding card board panel over rear of chassis.
6. Remove three hex head screws holding chassis in cabinet.
7. Remove four wood screws holding loop antenna to cabinet. Remove loop from cabinet.
8. Remove leads from speaker.
9. Remove six wood screws holding record changer mounting board in cabinet. Slide mounting board back as far as possible and remove chassis from cabinet.
10. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America


A13
74
8
72
A8
67
5
4
6
56
7
55
57
29
A5
1
A14
A3
63
A12
64
2
65
A1
66
A10
3
59
A6
58

31
71
52
11
10
53
45
46
9
A
18
44
A7
43
20
21
42
A9
48
40
A2
32
22
37
23
39
A11
60
15
A4
24
30
25
68
26
69
27
62
70
35
28
73
61
36
41
16
38
19
B
54
51
17
13
33
50
47
12
14
49
34

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	6BE6	6BE6	7CH	
2	1st IF Amp.	6BA6	6BA6	7BK	
3	2nd IF Amp.	6BA6	6BA6	7BK	
4	Ratio Det.	6AL5	6AL5	6BT	
5	Det.-AVC-AF	6AV6	6AV6		
6	Power Output	6V6GT	6V6GT	7AC	
7	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	40	200	45X360		UP4445C	DY-314	EL-432#	● Filter
B	40	150						■ "
C	20	25						▲ Cathode Bypass
9	5	100	45X361	PRS150-4	BR415	M-4-450	UT-41	Stabilizing Cap.
10	.001	800	H66102	1084-001	DT6D2	ST-6-001	TC-21	Output Plate Bypass
11	.004	200	B66402	484-004	DT6D4	ST-6-004	TC-24	Tone Comp.
12	.02	400	D66203	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
13	.005	400	D66502	484-005	DT6D5	ST-6-005	TC-25	" "
14	.04	200	B66403	484-04	DT4S4	ST-6-04	TC-14	Tone Compensation
15	.05	200	B66503	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
16	.01	400	D66103	484-01	DT4S1	ST-4-01	TC-11	Conv. Screen Decoup.
17	220	500	47X468	1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
18	470	500	47X510	1468-0005	5W5T5	MO.5-35	1FM-35	Diode Load Cap.
19	2700	300	47X492	1467-0025	1W5D25	MW.5-225	1FM-23	De-emphasis
20	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	2nd IF Decoupling-Cer.
21	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	2nd IF Cathode Bypass-Cer.
22	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	1st IF Decoupling-Cer.
23	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	1st IF Cathode Bypass-Cer.
24	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	Conv. Plate Decoup.-Cer.
25	10	500	47X512	1469-00001	5W5Q1	MO.5-41	MS-41	Fixed Trimmer-Cer.
26	470	500	47X510	1468-0005	5W5T5	MO.5-35	1FM-35	Osc. Feedback
27	5	500	47X513	1468-000005	5W5Y5	MO.5-55	MS-55	Osc. Feedback-Cer.
28	47	500	47X517	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.
29	100	500	47X511	1468-0001	5R5T1	MOS.5-31	MS-31	Fixed Pad-Cer.
30	500	500	47X508	1468-0005	5R5T5	MO.5-35	1FM-35	Filament Bypass-Cer.
31	100	500	47X476	1468-0001	5W5T1	MO.5-31	1FM-31	Line Ant. Coupling
32A	50	500	*	1468-00005	5W5Q5	MO.5-45	1FM-45	Diode RF Filter-Cer.
B	50	500	*	1468-00005	5W5Q5	MO.5-45	1FM-45	" " " "
76	68	500	47X471					Tone Comp.

*Items 32A, 32B and 75 are a resistor-capacitor combination obtainable as Airline Part #76X1.
#Omit one section.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
33A	500KΩ	½	36X347	D13-133X	AT-78	Volume Control tapped @ 100KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 33A per instructions
C	Switch		" "	41	SW-A	" " " " "
34A	3 Meg.	½	40X254	D13-140	AM-67-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 34A per instructions

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA: MEISSNER PART No.
59	Loop Ant.	0Ω	.8Ω	9A1954	
60	FM Ant.Coil		0Ω	9A1956	
61	AM Osc. "	.5Ω	5.1Ω	9A1929	14-1040
62	FM " "		0Ω	9A1938	
63	AM Input IF	15.5Ω	15.1Ω	9A1934	16-6668
64	FM " "	.6Ω	.1Ω	9A1932	
65	AM OutputIF	14.8Ω	14.8Ω	9A1935	16-6669
66	FM " "	.6Ω	.1Ω	9A1933	
67	Disc. Trans.	.9Ω	.1Ω	9A1936	
68	RF Fil. Choke		.3Ω	9A1882	
69	RF Plate Choke		.3Ω	9A1882	
70	Parasitic Choke		0Ω	9A1940	
71A	RF Line Chk.		0Ω	9A1930	
B	" " "		0Ω		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: AIRLINE PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
72	Bayonet	6-8	0.15	Brown	7A103		Type 47

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
73	Switch	2A374	Band
74	2 Gang Var. Cap.	14A202	*(15-518MMF, 35-208MMF)
A13	Trimmer	A17A247	FM Osc. Adj.
	Dial Glass	58X703	
	Dial Pointer	15X244	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	AIRLINE PART No.	IRC PART No.	
35	22KΩ	½	B84223	BTS-22K	Red-Red-Or. Oscillator Grid
36	1500Ω	½	B84152	BTS-1500	Br.-Grn.-Red Converter Screen Decoupling
37	1200Ω	½	B84122	BTS-1200	Br.-Red-Red Converter Plate Decoupling
38	8200Ω	2	D84822	BT-2-8200	Gray-Red-Red Bleeder
39	68Ω	½	B83680	BW-½-68	Blue-Gray-Blk. 1st IF Cathode
40	1200Ω	½	B84122	BTS-1200	Br.-Red-Red 1st IF Decoupling
41	2.2 Meg.	½	B85225	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
42	68Ω	½	B83680	BW-½-68	Blue-Gray-Blk. 2nd IF Cathode
43	1000Ω	½	B84102	BTS-1000	Br.-Blk.-Red 2nd IF Decoupling
44	27KΩ	½	B84273	BTS-27K	Red-Vi.-Or. De-emphasis
45	6800Ω	½	B84682	BTS-6800	Blue-Gray-Red Ratio Detector Diode Load
46	6800Ω	½	B84682	BTS-6800	Blue-Gray-Red " " " "
47	1 Meg.	½	B85105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
48	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. Series Phono
49	15KΩ	½	B84153	BTS-15K	Br.-Grn.-Or. Tone Compensation
50	10 Meg.	½	B85106	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
51	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
52	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. Output Grid
53	270Ω	½	B84271	BW-½-270	Red-Vi.-Br. Output Cathode
54	1000Ω	2	D84102	BT-2-1000	Br.-Blk.-Red Filter
75	47KΩ	*		BTS-47K	Diode Filter

*Items 32A, 32B and 75 are a resistor-capacitor combination obtainable as Airline Part #76X1.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	AIRLINE PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
55	117V AC @ .29A	320V CT @ .06A	6.3V AC @ 2.0A		53X291		T22R021†	

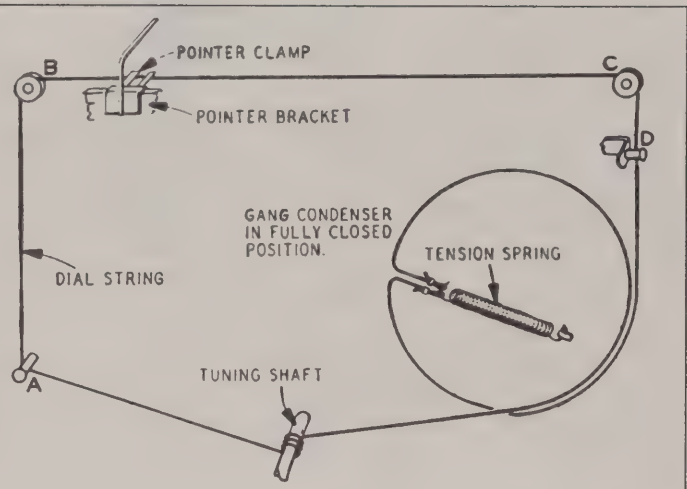
†Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		AIRLINE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
56	5000Ω	3.4Ω	500Ω	.8Ω	51X136	A-3877	T22S46	A-2930	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA				INSTALLATION NOTES
	FIELD	VC IMP.	AIRLINE PART No.	JENSEN PART No.	QUAM PART No.		
57	PM	3.4Ω	12A484				
	CONE DIA.	VC DIA.					
58	4-7/8" x 7"	5/8"					

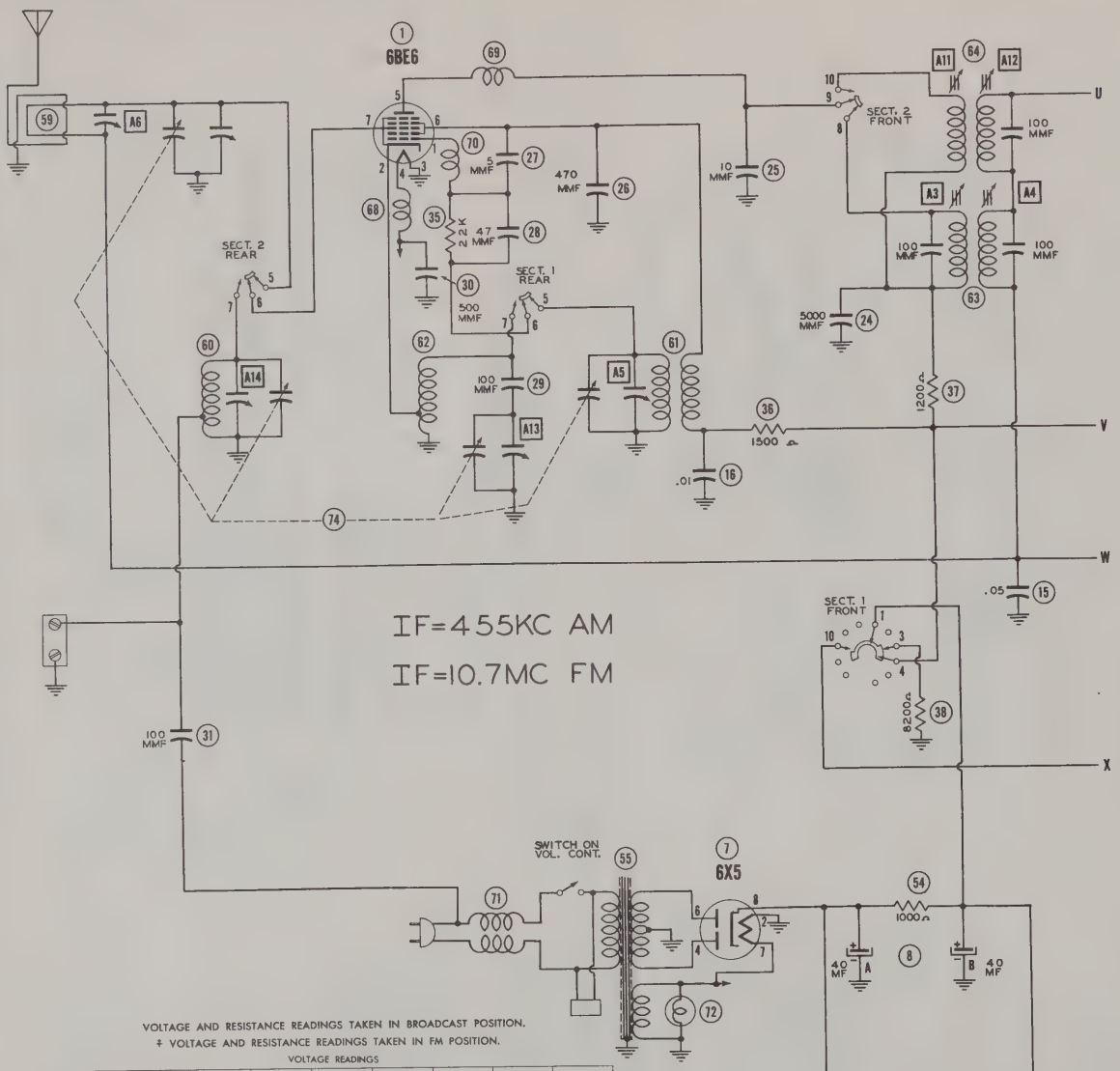


DRIVE CORD REPLACEMENT

DIAL POINTER CORD

Use a new 10X70 drive cord assembly or a new length of cord 51 inches long for the installation. Install the cord as shown in the illustration, winding three turns clockwise around the drive shaft with the turns progressing away from the chassis. After completing the installation rotate the drive shaft a few turns to take up the slack in the cord.

DATE 4/48-#488-1
SET #38-FOLDER #1



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BE6	-9VDC§	0V.	0V.	6.3VAC	110VDC	105VDC	-.1VDC	
2	6BA6	-.1VDC	0V.	0V.	6.3VAC	97VDC	97VDC	1VDC	
‡ 3	6BA6	0V.	0V.	0V.	6.3VAC	95VDC	95VDC	.9VDC	-
‡ 4	6AL5	0V.	0V.	0V.	6.3VAC	.4VDC	0V.	-.4VDC	-
5	6AV6	-.6VDC	0V.	0V.	6.3VAC	-.6VDC	-.6VDC	52VDC	-
6	6V6GT	0V.	6.3VAC	150VDC	115VDC	0V.	0V.	0V.	4.6VDC
7	6X5GT	0V.	0V.	160VAC	0V.	160VAC	0V.	6.3VAC	157VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

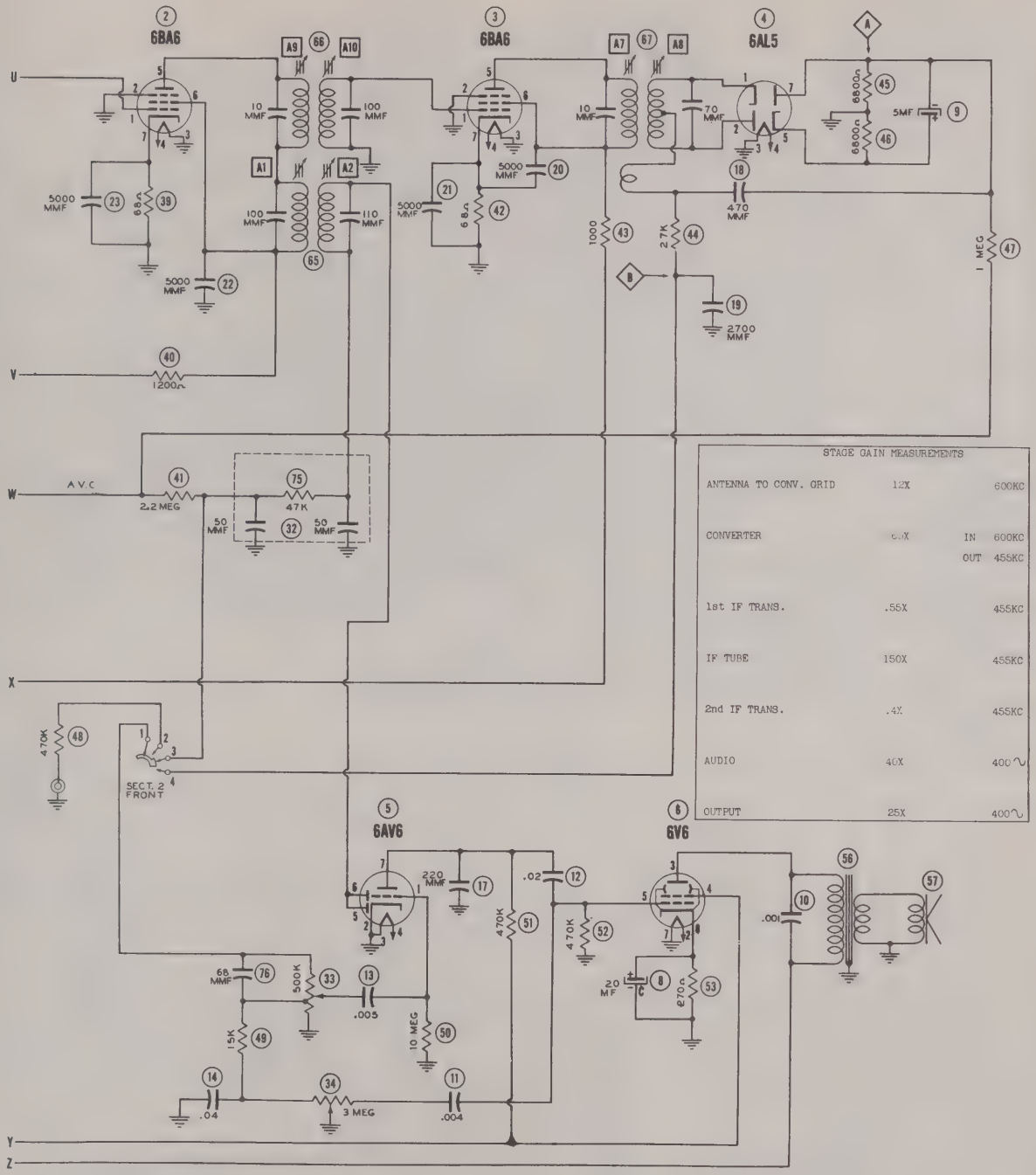
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BE6	22KΩ	0Ω	0Ω	.1Ω	9.2KΩ	9.5KΩ	700KΩ	-
2	6BA6	700KΩ	0Ω	0Ω	.1Ω	9.2KΩ	9.2KΩ	108Ω	-
‡ 3	6BA6	0Ω	0Ω	0Ω	.1Ω	250KΩ	250KΩ	68Ω	-
‡ 4	6AL5	500KΩ	500KΩ	0Ω	.1Ω	6.8KΩ	INF.	6.8KΩ	-
5	6AV6	10 Meg.	0Ω	8KΩ	9KΩ	470KΩ	500KΩ	480KΩ	-
6	6V6GT	INF.	.1Ω	8KΩ	9KΩ	470KΩ	0Ω	0Ω	260Ω
7	6X5GT	INF.	0Ω	150Ω	INF.	140Ω	INF.	.1Ω	8KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



STAGE GAIN MEASUREMENTS

ANTENNA TO CONV. GRID	12X		600KC
CONVERTER	6.0X	IN	600KC
		OUT	455KC
1st IF TRANS.	.55X		455KC
IF TUBE	150X		455KC
2nd IF TRANS.	.4X		455KC
AUDIO	40X		400~
OUTPUT	25X		400~

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use insulated alignment screwdriver for all adjustments.
Allow receiver and signal generator to warm up for about 15 minutes prior to attempting alignment.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 1 (grid) 6BA6 IF Tube (2). Low side to chassis.	455KC	BC (center position)	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output.
2	.1 MFD.	High side to Pin 7 (grid) 6BE6. Low side to chassis.	455KC	"	"	"	A3,A4.	" " " "
3	.1 MFD.	"	1620KC	"	"	"	A5	" " " "
4	50MMFD	High side to ext. ant. clip. Low side to chassis.	1400KC	"	Tune for maximum output.	"	A6	Adjust for maximum output. Set pointer to 1400KC calibration mark. (Trimmers on ant. stator of tuning cap. are factory adjustments and ordinarily need not be changed.)

FM ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5	.01 MFD.	High side to Pin 1 (grid) 6BA6 2nd IF Tube (3). Low side to chassis.	10.7MC (unmodulated)	FM (fully clockwise)	Tuning cap. fully open.	DC probe to Point (A). Common to chassis	A7	Adjust for maximum deflection.
6	.01 MFD	"	"	"	"	DC probe to Point (B). Common to chassis	A8	Use a zero centered VTVM if available. Adjust for zero deflection. Repeat Steps 5 & 6 until no further improvement can be made.
7	.01 MFD	High side to Pin 1 (grid) 6BA6 1st IF Tube (2). Low side to chassis.	"	"	"	DC probe to Point (A). Common to chassis	A9,A10	Adjust for maximum deflection. Attenuate signal to give same maximum reading as obtained in Step 5.
8	.01 MFD	High side to Pin 7 (grid) 6BE6. Low side to chassis.	"	"	"	"	A11, A12	"
9	300Ω carbon res	Disconnect built in FM ant. lead. High side sig. gen. in series with 300Ω resistor to ungrounded FM ant. terminal. Low side to chassis.	108.5MC (unmodulated)	"	"	"	A13	Adjust for maximum deflection.
10	"	"	104.5MC (unmodulated)	"	Tune for maximum deflection.	"	A14	Rock tuning cap. and adjust for maximum deflection. Repeat Steps 9 & 10 until no further improvement can be made.

FM ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
5	.01 MFD	High side to Pin 1 (grid) 6BA6 1st IF Tube. Low side to chassis.	10.7MC (Freq. modulated)	FM (fully clockwise)	Tuning cap. fully open.	Vertical input to Point (A). Ground to chassis.	A7,A10, A9	Disconnect 5 MFD cap. from Point (A). Adjust A7, A10 & A9 for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
6	.01 MFD	Disconnect lead from Pin 7 (grid) 6BE6 to switch. Connect 100KΩ resistor from Pin 7 to chassis making leads as short as possible. High side of sig gen. to Pin 7. Low side to chassis.	"	"	"	"	A12, A11	Adjust for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
7	.01 MFD	Remove 100KΩ resistor from Step 6. Reconnect Pin 7 6BE6 to switch. High side to Pin 1 (grid) 6BA6 1st IF Tube. Low side to chassis.	"	"	"	Vertical input to Point (B). Ground to chassis.	A8	Reconnect 5 MFD to Point (A). Adjust A8 for maximum straightness of crossover lines with crossover occurring at center of Pattern of Fig. 2.
8	300Ω carbon res.	Remove built in FM Ant. lead from FM ant. terminal strip. High side of sig gen. to ungrounded FM ant. terminal. Low side to chassis.	108.5MC (Freq. Mod.)	"	"	Vertical input to Point (A). Ground to chassis.	A13	Disconnect 5 MFD cap. from Point (A). Adjust A13 for coincidence of pattern of Fig. 1.
9	"	"	104.5MC (Freq. Mod.)	"	Tune for coincidence.	"	A14	Adjust for maximum amplitude of pattern of Fig. 1. Repeat Steps 8 & 9 until no further improvement can be made. Reconnect 5 MFD cap. to Point (A).

FIG. 1

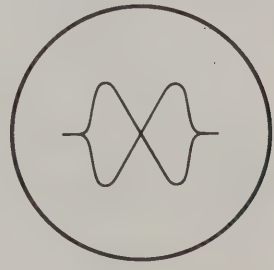


FIG. 2

CROSLEY
MODEL 58TW

CROSLEY
MODEL 58TW

CROSLEY MODEL 58TW

TRADE NAME	Crosley, Model 58TW
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Ant.
TUBES (Five)	Types 14Q7 Converter, 14A7 IF Amp., 14B6 Det.-AVC-AF, 50A5 Power Output, 35Y4 Rectifier
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1620KC

RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap fully closed and set pointer to calibration mark at lower left hand corner of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning capacitor. Low side to B-.	455KC	Tuning capacitor fully open.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	200MMFD	High side to ext. ant. clip. Low side to chassis.	1620KC	Tuning capacitor fully open.	Across voice coil	A5	Adjust for maximum output.
3	200MMFD	High side to ext. ant. clip. Low side to chassis.	1400KC	Tune for maximum output.	Across voice coil	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 4/48-#488-2 SET #38-FOLDER #2

PARTS LIST AND DESCRIPTIONS

CROSLEY MODEL 58TW

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	14Q7	14Q7	8AL	
2	IF Amp.	14A7	14A7	8V	
3	Det.-AVC-AF	14B6	14B6	8W	
4	Power Output	50A5	50A5	6AA	
5	Rectifier	35Y4	35Y4	5AL	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CROSLEY PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	50	150		TA-530	PRSA150-30-50	EDL5315	DSB-5030-150	Filter - Red
B	30	150						Filter - Blue
7	.05	200		TC-15	484-05	DT2S5	ST-4-05	Line Filter
8	.02	400		TC-12	484-02	DT4S2	ST-4-02	Output Plate Bypass
9	.02	200		TC-12	484-02	DT2S2	ST-4-02	Audio Coupling
10	.003	600		TC-23	684-003	DT6D3	ST-6-003	" "
11	.00025	600		1FM-325	1468-00025	DT6T25	ST-6-00025	AF Plate Bypass
12	.05	200		TC-15	484-05	DT2S5	ST-4-05	AVC Filter
13	.05	200		TC-15	484-05	DT2S5	ST-4-05	Line Isolation

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
14A	1 Meg.	½	B-135127-C	D-13-137	AM-63-2	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 14A per instructions
C	Switch		Not Req.	41	SW-A	Attach to 14A per instructions

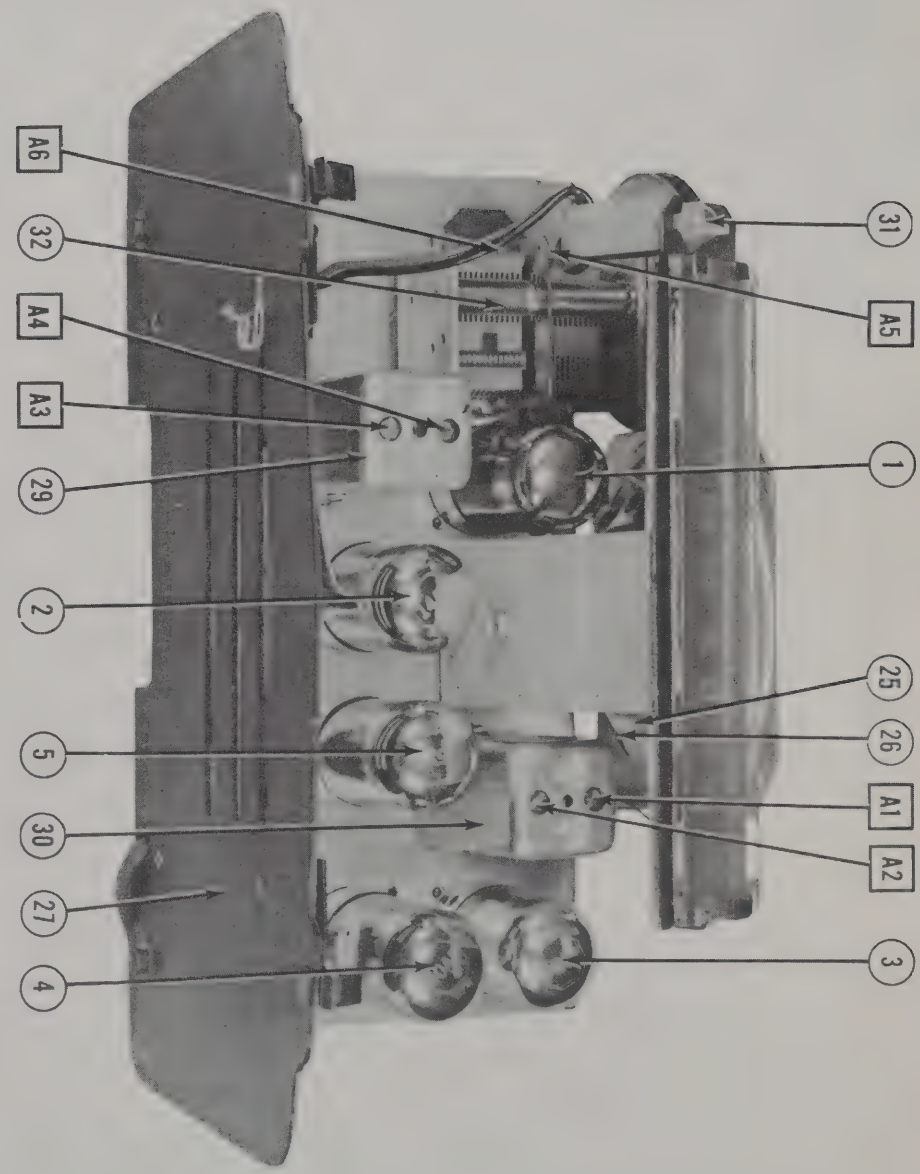
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CROSLEY PART No.	IRC PART No.	IDENTIFICATION CODES
15	47KΩ	½		BTS-47k	Yl.-Vi.-Or. Oscillator Grid
16	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
17	5 Meg.	½		BTS-4.7 Meg.	Grn.-Blk.-Grn. AF Grid
18	470KΩ	½		FTS-470K	Yl.-Vi.-Yl. AF Plate Load
19	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
20	150Ω	½		BW-½-150	Yl.-Vi.-Yl. Output Cathode
21	1200Ω	1		BTA-1200	Br.-Red-Red Filter
22	47Ω	1		BW-1-47	Yl.-Vi.-Blk. Surge Limiter
23	150Ω	½		BW-½-150	Br.-Grn.-Br. Pilot Light Shunt

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: CROSLEY PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
24	2300Ω	3.9Ω	230Ω	1Ω	137723	A-3876	T22S45	A-2928	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: CROSLEY PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
25	FIELD PM	VC IMP. 3.9Ω	138459	ST-113* Mod. P4-X	4A1*	*Drill and tap magnet frame.
26	CONE DIA. 4 in.	VC DIA. ½ in.				

R F COILS

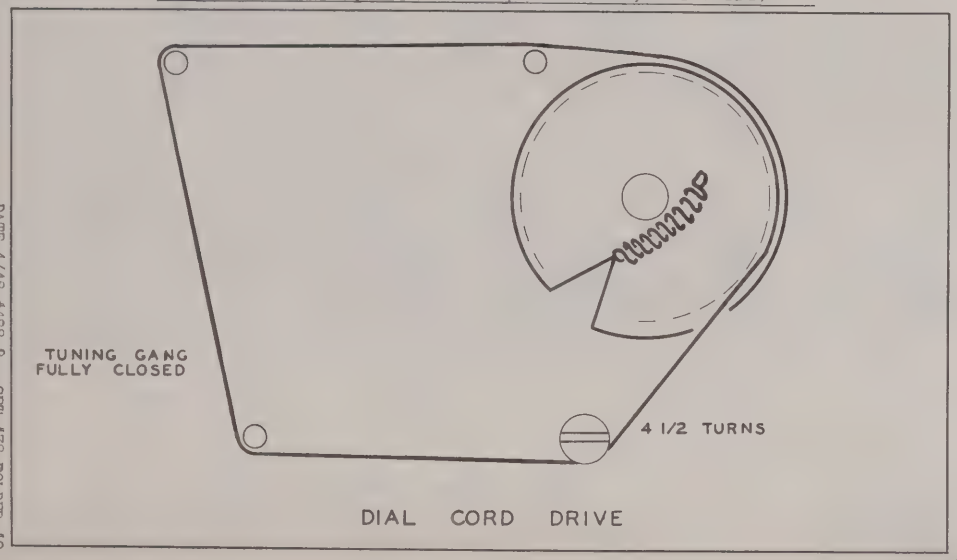
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: MEISSNER PART No.	
27	Loop Ant.	.2Ω	1.2Ω			
28	Osc.Coil	.5Ω	5.5Ω		14-1060†	†Add 50 MMFD From Osc. Grid to high side tuning capacitor.
29	Input IF	31Ω	30Ω		16-6658	
30	Output IF	33Ω			16-6670	

DIAL LIGHT

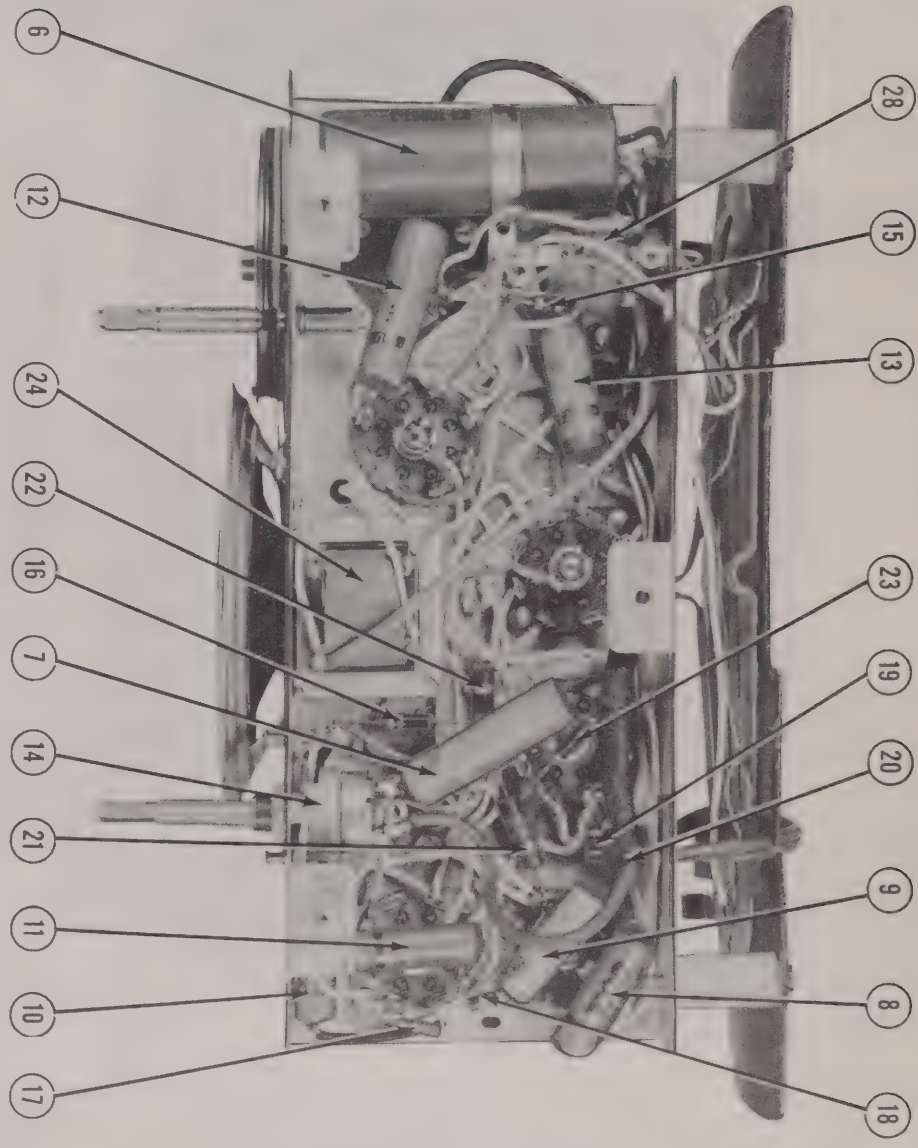
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: CROSLEY PART No.		INSTALLATION NOTES
31	Bayonet	6-8V	.15A	Brown			Type 47

MISCELLANEOUS

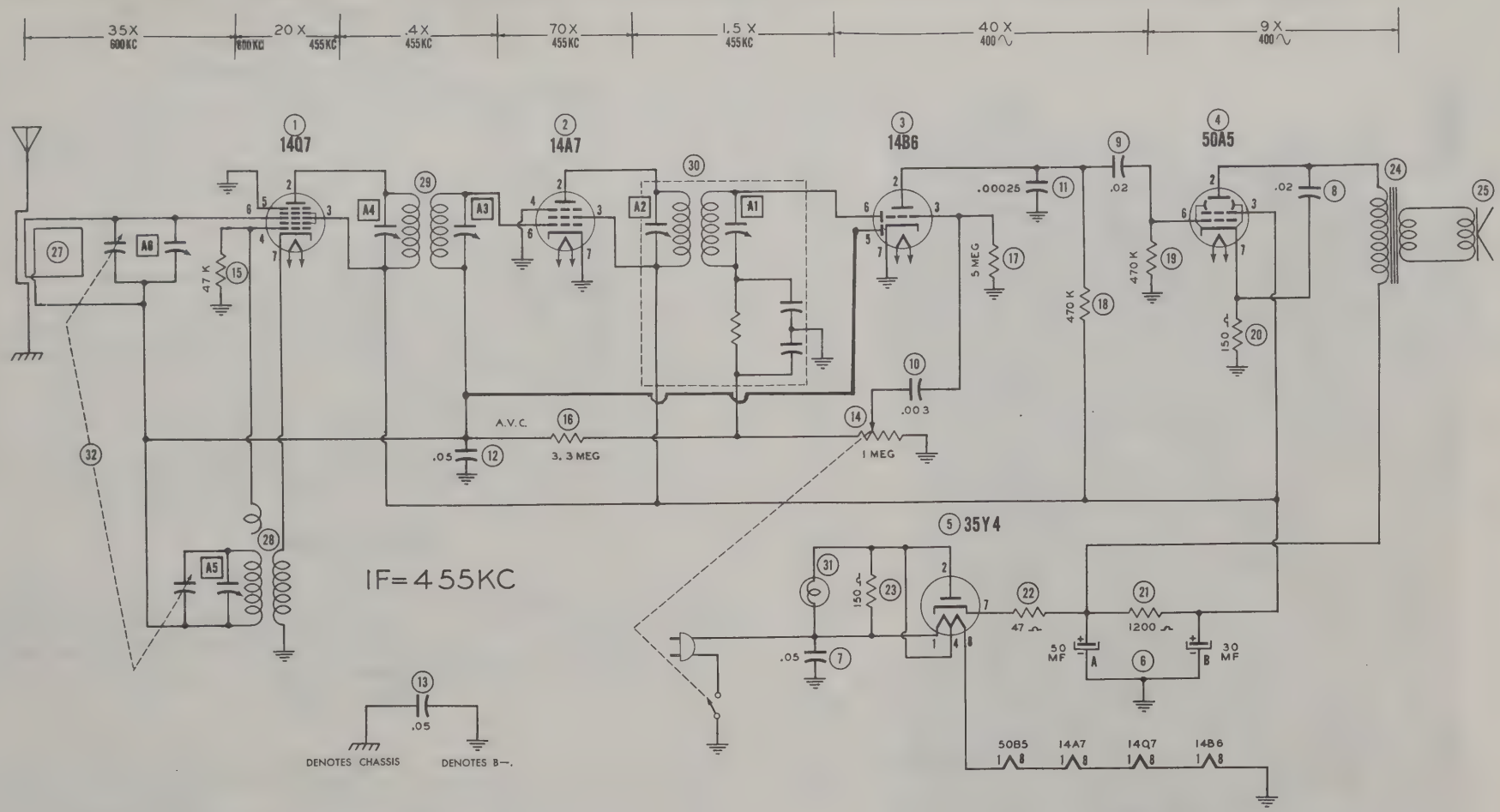
ITEM No.	PART NAME	CROSLEY PART No.	NOTES
32	2 Gang Var.Cap.		(21-467 MMFD, 28-192 MMFD)



CHASSIS—BOTTOM VIEW



DATE 4/48-#48-2 SET #28-FOLDER #2
CROSLEY MODEL 58TW
CH 5L5Y MODEL 58TW



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14Q7	25VAC	87VDC	87VDC	-10VDC§	0V.	-.6VDC	0V.	12.5VAC
2	14A7	39VAC	87VDC	87VDC	0V.	0V.	-.6VDC	0V.	25VAC
3	14B6	12.5VAC	50VDC	-.6VDC	0V.	0V.	-.6VDC	0V.	0V.
4	50A5	86VAC	106VDC	87VDC	0V.	87VDC	0V.	5.2VDC	39VAC
5	35Y4	117VAC	112VAC	0V.	112VAC	113VDC	-.6VDC	116VDC	86VAC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14Q7	24Ω	70KΩ	70KΩ	47KΩ	0Ω	4 Meg.	.5Ω	12Ω
2	14A7	36Ω	70KΩ	70KΩ	0Ω	0Ω	4 Meg.	0Ω	24Ω
3	14B6	12Ω	540KΩ	5 Meg.	0Ω	0Ω	1 Meg.	0Ω	0Ω
4	50A5	85Ω	70KΩ	70KΩ	INF.	70KΩ	470KΩ	150Ω	36Ω
5	35Y4	115Ω	105Ω	0Ω	105Ω	70KΩ	4 Meg.	70KΩ	85Ω

A PHOTOFACT STANDARD NOTATION SCHEMATIC

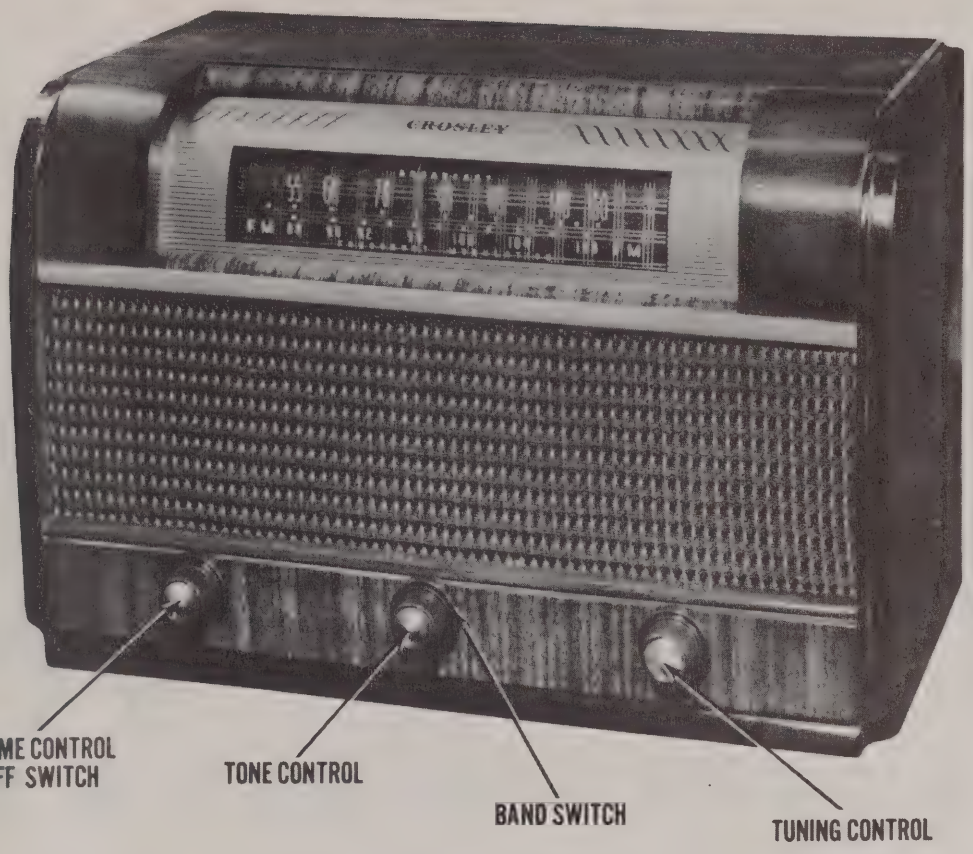
©Howard W. Sams & Co., Inc. 1948

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

488-2

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



CROSLEY MODELS
88TA, 88TC

CROSLEY MODELS
88TA, 88TC

CROSLEY MODEL 88TC

TRADE NAME	Crosley, Models 88TA, 88TC		
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio		
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna		
TUBES (EIGHT)	Types, 6SH7 Mixer, 7F8 Converter, 6SG7 IF Amp., 6SH7 FM Limiter-AM Det., 6H6 FM Det., 6SJ7 AF Amp., 25L6GT Power Output, 25Z6GT Rectifier.		
POWER SUPPLY	105-125 Volts AC-DC	RATING	.38 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC	FREQ. MOD.	88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not connect a .1 MFD. capacitor in series with low side of signal generator and B-.

Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	100MMFD	High side to Pin 4 (grid) 6SH7 Mixer Tube 1. Low side to chassis.	455KC	BC (Counter-clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	100MMFD	High side to rear stator of tuning cap. Low side to chassis.	1400KC	"	1400KC	"	A5	Adjust for maximum output Check to see if receiver will tune from 540-1600KC
3	220MMFD	High side to ext. ant. lead. Low side to chassis.	"	"	Tune for max-imum output.	"	A6	"

FOR FM ALIGNMENT SEE PAGE 5 OF THIS FOLDER.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 4/48-#488-3 SET #38-FOLDER #3

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		CROSLEY PART No.	STANDARD REPLACEMENT		
1	Mixer	6SH7	6SH7	8BK	
2	Oscillator	7F8	7F8	8BW	
3	IF Amp.	6SG7	6SG7	8BK	
4	FM Lim.-AM Det.	6SH7	6SH7	8BK	
5	FM Det.	6H6	6H6	7Q	
6	AF Amp.	6SJ7	6SJ7	8N	
7	Power Output	25L6GT	25L6GT	7AC	
8	Rectifier	25Z6GT	25Z6GT	7Q	

CAPACITORS

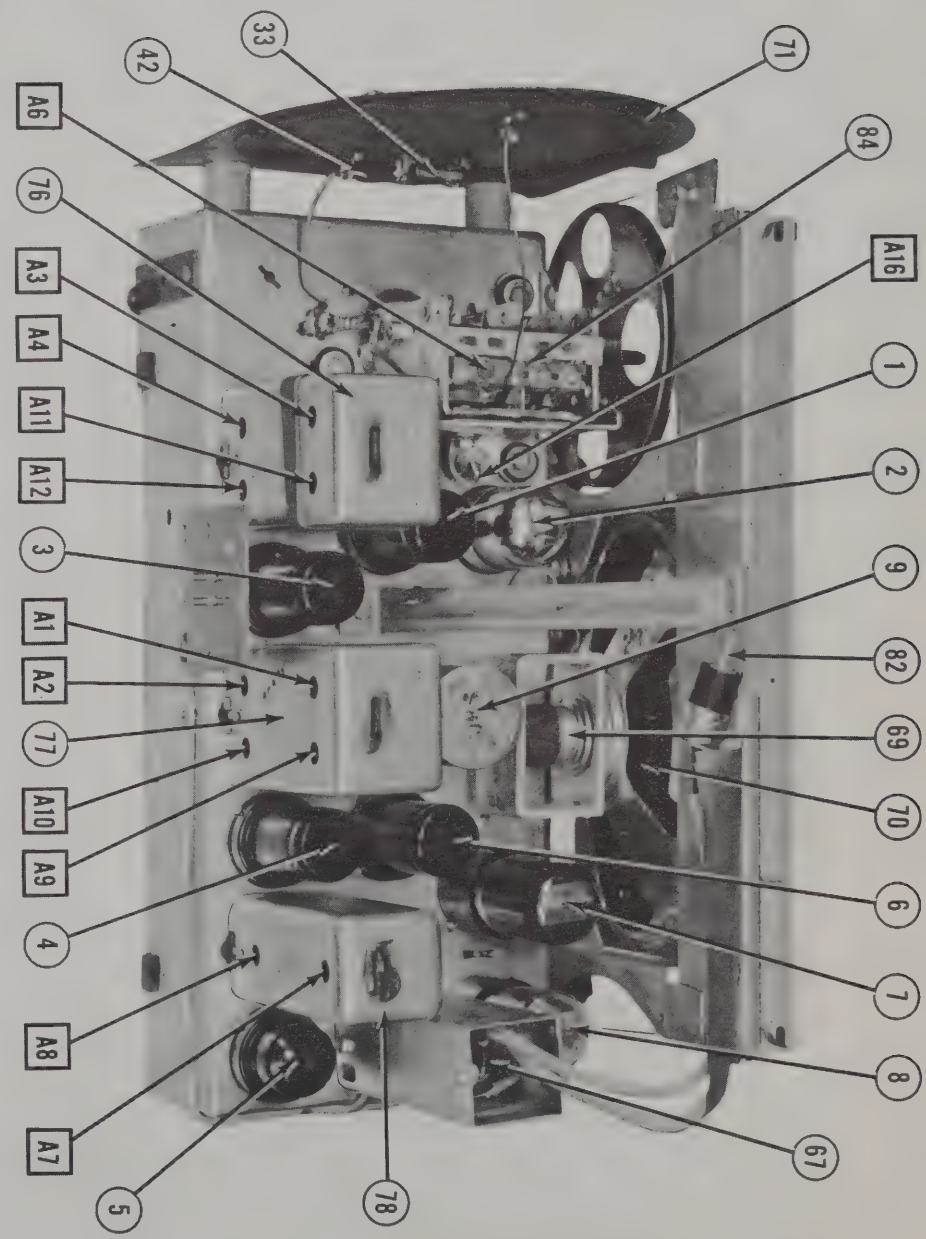
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	CROSLEY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
9A	50	200	B-137976	AF101C10D4A	UP555150		EL-352	◆ Filter
B	50	200					UT-501	■ "
C	50	150						▲ "
D	20	25						Output Cathode Bypass
10	.05	400	39001-17	484-05	DT4S5	ST-4-05	TC-15	Line Filter
11	.05	400	39001-17	484-05	DT4S5	ST-4-05	TC-15	Filament Bypass
12	.02	600	39001-80	684-02	DT6S2	ST-6-02	TC-12	Output Plate Bypass
13	.003	600	39001-76	684-003	DT6D3	ST-6-003	TC-23	Tone Compensation
14	.003	600	39001-76	684-003	DT6D3	ST-6-003	TC-23	" "
15	.01	200	AW-139056	4c4-01	DT4S1	ST-4-01	TC-11	Audio Coupling
16	.05	200	39001-17	484-05	DT4S5	ST-4-05	TC-15	Isolation
17	.05	200	39001-17	484-05	DT4S5	ST-4-05	TC-15	AF Screen Bypass
18	.01	200	39001-13	484-01	DT4S1	ST-4-01	TC-11	Limiter Decoupling
19	.1	200	39001-19	464-.1	DT4P1	ST-4-.1	TC-1	AVC Filter
20	.01	200	39001-13	484-01	DT4S1	ST-4-01	TC-11	1st IF Decoupling
21	.01	400	39001-13	484-01	DT4S1	ST-4-01	TC-11	Mixer Decoup.
22	.01	400	39001-13	464-01	DT4S1	ST-4-01	TC-11	Osc. Plate Decoup.
23	1000	300	C-137727-8	1468-001	1W5D1	MO.3-21	1FM-21	Fil. Bypass-Cer.
24	1000	300	C-137727-8	1468-001	1W5D1	MO.3-21	1FM-21	" " "
25	1000	300	C-137727-8	1468-001	1W5D1	MO.3-21	1FM-21	" " "
26	1000	300	C-137727-8	1468-001	1W5D1	MO.3-21	1FM-21	" " "
27	1000	300	C-137727-8	1468-001	1W5D1	MO.3-21	1FM-21	" " "
28	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass-Cer.
29	1000	300	C-137727-8	1468-001	1W5D1	MO.3-21	1FM-21	Audio Coupling-Cer.
30	1000	300	C-137727-8	1468-001	1W5D1	MO.3-21	1FM-21	Limiter Decoup.-Cer.
31	1000	300	C-137727-8	1468-001	1W5D1	MO.3-21	1FM-21	Ant. Coupling. -Cer.
32	1000	300	C-137727-8	1468-001	1W5D1	MO.3-21	1FM-21	" " "
33	1000	300	C-137727-8	1468-001	1W5D1	MO.3-21	1FM-21	" " "
34	3.3	500						RF Coupling-Cer.
35	180	500	C-137727-24	1468-0002	5W5T2	MO.5-32	1FM-32	RF Coupling-Cer.
36	10	300	C-137727-37	1468-00001	5W5Q1	MO.5-41	MS-41	Osc. Coupling-Cer.
37	500	300	B-137499-5	1468-0005	5W5T5	MOS.5-35	MS-35	Osc. Feedback-Silver
38	39	300	C-137727-19	1468-00004	5W5Q4	MO.5-44	1FM-44	Osc. Grid Cap.-Cer.
39	1000	300	C-137727-8	1468-001	1W5D1	MO.3-21	1FM-21	Audio Coupling-Cer.
85	51		C-137727-28	1468-00005	5W5Q5	MO.5-45	MS-45	RF Bypass-Cer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	
40A	1 Meg.	½	B137781	D13-137X		Volume Control tapped @ 350KΩ
B	Shaft		Not Req.	E		Attach to 40A per instructions
C	Switch		" "	41		" " " " "
41A	2 Meg.	½	B137782	D13-139	AM-66-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 41A per instructions

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	CROSLEY PART No.	IRC PART No.	
42	1 Meg.	½	39373-92	BTS-1 Meg.	Br.-Blk.-Grn. Series Antenna
43	1 Meg.	½	39373-92	BTS-1 Meg.	Br.-Blk.-Grn. " "
44	1 Meg.	½	39373-92	BTS-1 Meg.	Br.-Blk.-Grn. " "
45	1000Ω	½	39373-33	BTS-1000	Br.-Blk.-Red Oscillator Plate Load
46	33KΩ	½	39373-64	BTS-33K	Or.-Or.-Or. Oscillator Grid
47	10KΩ	½	39373-54	BTS-10K	Br.-Blk.-Or. Decoupling
48	1000Ω	½	39373-33	BTS-1000	Br.-Blk.-Red "
49	47KΩ	½	39373-67	BTS-47K	Yl.-Vi.-Or. Coupling Coil Shunt
50	1 Meg.	½	39373-92	BTS-1 Meg.	Br.-Blk.-Grn. Converter Grid
51	47KΩ	½	39373-67	BTS-47K	Yl.-Vi.-Or. Converter Decoupling
52	1000Ω	½	39373-33	BTS-1000	Br.-Blk.-Red Limiter Decoupling
53	1 Meg.	½	39373-92	BTS-1 Meg.	Br.-Blk.-Grn. IF Grid
54	2 Meg.	½	39373-97	BTS-2.2 Meg.	Red-Blk.-Grn. AVC Network
55	1000Ω	½	39373-33	BTS-1000	Br.-Blk.-Red 1st IF Decoupling
56	22KΩ	½		BTS-22K	Red-Red-Or. Limiter Voltage Dropping-See Note 1
57	10KΩ	½	39373-54	BTS-10K	Br.-Blk.-Or. Bleeder-See Note 1
58	10KΩ	½	39373-54	BTS-10K	Br.-Blk.-Or. Tone Compensation
59	100KΩ	½	39373-74	BTS-100K	Br.-Blk.-Yl. " "
60	4.7 Meg.	½	39373-102	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
61	1.2 Meg.	½	39373-93	BTS-1.2 Meg.	Br.-Red-Grn. AF Screen Dropping
62	330KΩ	½	39373-84	BTS-330K	Or.-Or.-Yl. AF Plate Load
63	470KΩ	½	39373-87	BTS-470K	Yl.-Vi.-Yl. Output Grid
64	150Ω	½	39373-16	BW-½-150	Br.-Grn.-Br. Output Cathode
65	1000Ω	1	39373-143	BTA-1000	Br.-Blk.-Red Filter
66	47Ω	½	39373-9	BW-½-47	Yl.-Vi.-Blk. "
67A	18Ω		W-139035		Pilot Light Shunt
B	80Ω				Line Dropping

Note 1-In some models Item 57 is not used and Item 56 is 1000Ω.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		CROSLEY PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
68	2500Ω	4.4Ω	390Ω	.9Ω	137364	A-3876	T22S45	A-2928	

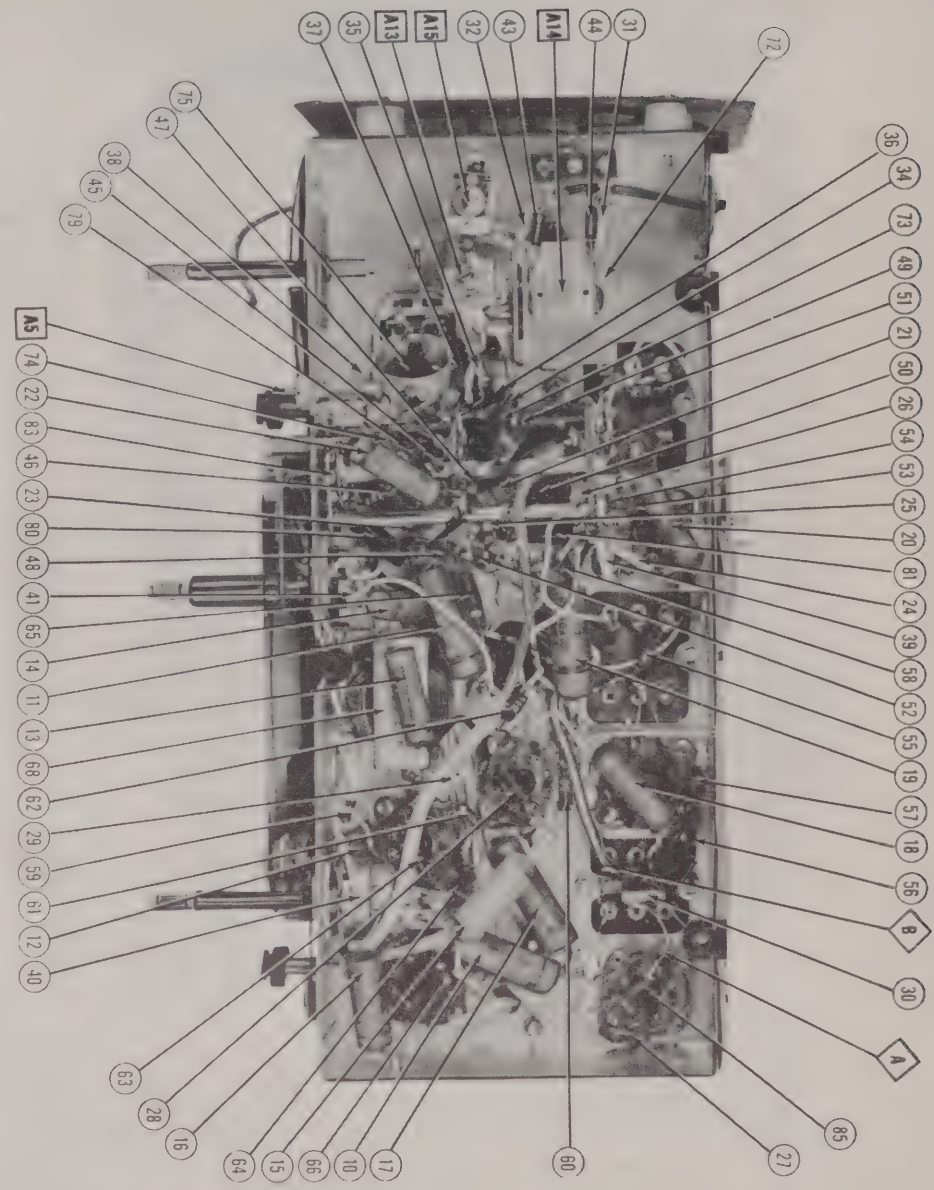
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			CROSLEY PART No.	JENSEN PART No.	QUAM PART No.	
69	FIELD RES.	VC IMP.	138246		46A1	
	PM	4.4Ω				
70	CONE DIA.	VC DIA.				
	4"x6"	1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	CROSLEY PART No.	MEISSNER PART No.	
71	Loop Ant.	.1Ω	2Ω	AB-139118		
72	FM Ant.Coil		0Ω	AC-137783		
73	RF Coupling		55Ω	AW-138950		
74	BC Osc.Coil	1Ω	6Ω	AW-138924		
75	FM Osc.Coil		0Ω	W-139286		
76A	AM 1st IF	8Ω	INF.	AC-138819		
B	FM 1st IF	.3Ω	INF.			
77A	AM 2nd IF	5.5Ω*		AC-139094		*Includes both primaries.
B	FM 2nd IF					
78	FM Disc.	.3Ω	2Ω	AC-139077		
79	FM Plate Chk.		0Ω	AW-138978		
80	Fil. Choke		.1Ω	AW-136720		
81	" "		.1Ω	AW-136720		

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

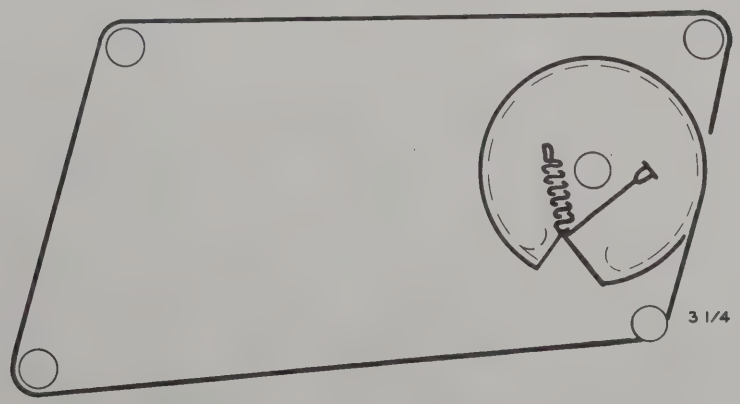
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA CROSLEY PART No.		INSTALLATION NOTES
82	Bayonet	6-8	0.15	Brown	W-48858		T e 47

MISCELLANEOUS

ITEM No.	PART NAME	CROSLEY PART No.	NOTES
83	Switch	B-137986	Band
84	Tuning Cap.	C-130028	
A5	Trimmer	W-138268	BC Osc. Adj.
A15	"	C-136327-29	FM Ant. Adj.
	Dial Assembly	AB-139105	
	Dial Pointer	W-137460	

TUNING GANG FULLY CLOSED



DIAL CORD DRIVE

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SH7	0V.	24VAC	0V.	-.6VDC	0V.	50VDC	31VAC	50VDC
2	7F8	-3VDC§	31VAC	82VDC	0V.	0V.	102VDC	37VAC	-3VDC§
3	6SG7	0V.	24VAC	0V.	-.4VDC	0V.	29VDC	18VAC	99VDC
‡ 4	6SH7	0V.	12VAC	0V.	-.4VDC	0V.	25VDC	18VAC	25VDC
‡ 5	6H6	0V.	0V.	-.4VDC	0V.	-.4VDC	0V.	6VAC	0V.
6	6SJ7	0V.	12VAC	0V.	-.5VDC	0V.	17VDC	6VAC	27VDC
7	25L6GT	0V.	62VAC	109VDC	107VDC	0V.	107VDC	37VAC	6.9VDC
8	25Z6GT	0V.	81VAC	110VDC	126VDC	110VAC	124VDC	62VAC	126VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SH7	0Ω	15.5Ω	0Ω	4.2 Meg.	0Ω	200KΩ	20Ω	200KΩ
2	7F8	33KΩ	20Ω	162KΩ	0Ω	0Ω	151KΩ	23Ω	33KΩ
3	6SG7	0Ω	15.5Ω	0Ω	4.2 Meg.	0Ω	150KΩ	12Ω	150KΩ
‡ 4	6SH7	0Ω	9.5Ω	0Ω	1 Meg.	0Ω	170KΩ	12Ω	170KΩ
‡ 5	6H6	0Ω	0Ω	100KΩ	200KΩ	100KΩ	INF.	5Ω	0Ω
6	6SJ7	0Ω	9.5Ω	0Ω	4.7 Meg.	0Ω	1.3 Meg.	5Ω	480KΩ
7	25L6GT	0Ω	35Ω	150KΩ	150KΩ	470KΩ	150KΩ	23Ω	150Ω
8	25Z6GT	INF.	48Ω	125Ω	150KΩ	125Ω	150KΩ	35Ω	150KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

DATE 4/48-#488-3 SET #38-FOLDER #3

FM ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

In Step 10 field strength meter may consist of DC 100 microampere (full scale) meter shunted with 1000MMFD bypass capacitor and a germanium crystal rectifier connected in series with meter and one side of 5 ft. 75Ω twisted pair of leads. The other side of twisted pair goes to other side of meter. Connect 75Ω carbon resistor across meter end of twisted pair. Open ends of twisted pair connected to FM dipole terminals.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4	30MMFD.	High side to Pin 4 (grid) 6SH7 2nd IF Tube (3). Low side to chassis.	10.7MC (unmodulated)	FM (clockwise)	Tuning cap. fully closed	DC probe to Point (A). Common to chassis	A7	Adjust for maximum deflection.
5	30MMFD.	"	"	"	"	DC probe to Point (B). Common to chassis	A8	Adjust for zero deflection. Repeat Steps 4 & 5 until no further improvement can be made.
6	30MMFD.	High side to Pin 4 (grid) 6SG7 1st IF Tube (2). Low side to chassis.	"	"	"	DC probe to Point (A). Common to chassis	A9,A10	Adjust for maximum deflection.
7	30MMFD.	High side to Pin 4 (grid) 6SH7 Mixer Tube 1. Low side to chassis.	"	"	"	"	A11,A12	"
8	2 39Ω carbon resistors.	Each side in series with 39Ω resistor to FM dipole terminals.	98MC	"	Tune for maximum deflection.	"	A13	Shunt A14 with 10Ω carbon resistor. Adjust A13 for maximum deflection.
9	"	"	"	"	"	"	A14	Transfer shunt to A13. Adjust A14 for maximum deflection.
10		Replace sig. gen. with field strength meter per prealignment notes.	92MC	"	Tune for maximum deflection.	"	A15	Adjust for null point on field strength meter. If this adjustment required more than ½ turn of A15 Steps 9 & 10 should be repeated.
11	2 39Ω carbon res.	Remove field strength meter. Reconnect sig. gen. as in Step 8.	98MC	"	98MC	"	A16	Adjust for maximum deflection.

FM ALIGNMENT USING FM SIGNAL GENERATOR, OSCILLOSCOPE AND OUTPUT METER

Use freq. modulated signal 450KC sweep with 60∿modulation. Connect 60∿sync. voltage from signal generator to horizontal input terminals. If this sync. voltage is not available from sig. gen. it may be obtained from AC line. There may be some phase shift between horizontal and vertical sweep voltages resulting in a double trace pattern such as Fig. 2. If sig. gen. or scope have a phasing control rotate it until the single trace pattern results. If this control is not available the same thing may be accomplished by inserting a cap. of suitable value (.01 to .1 MFD) in series with sync. voltage to scope.

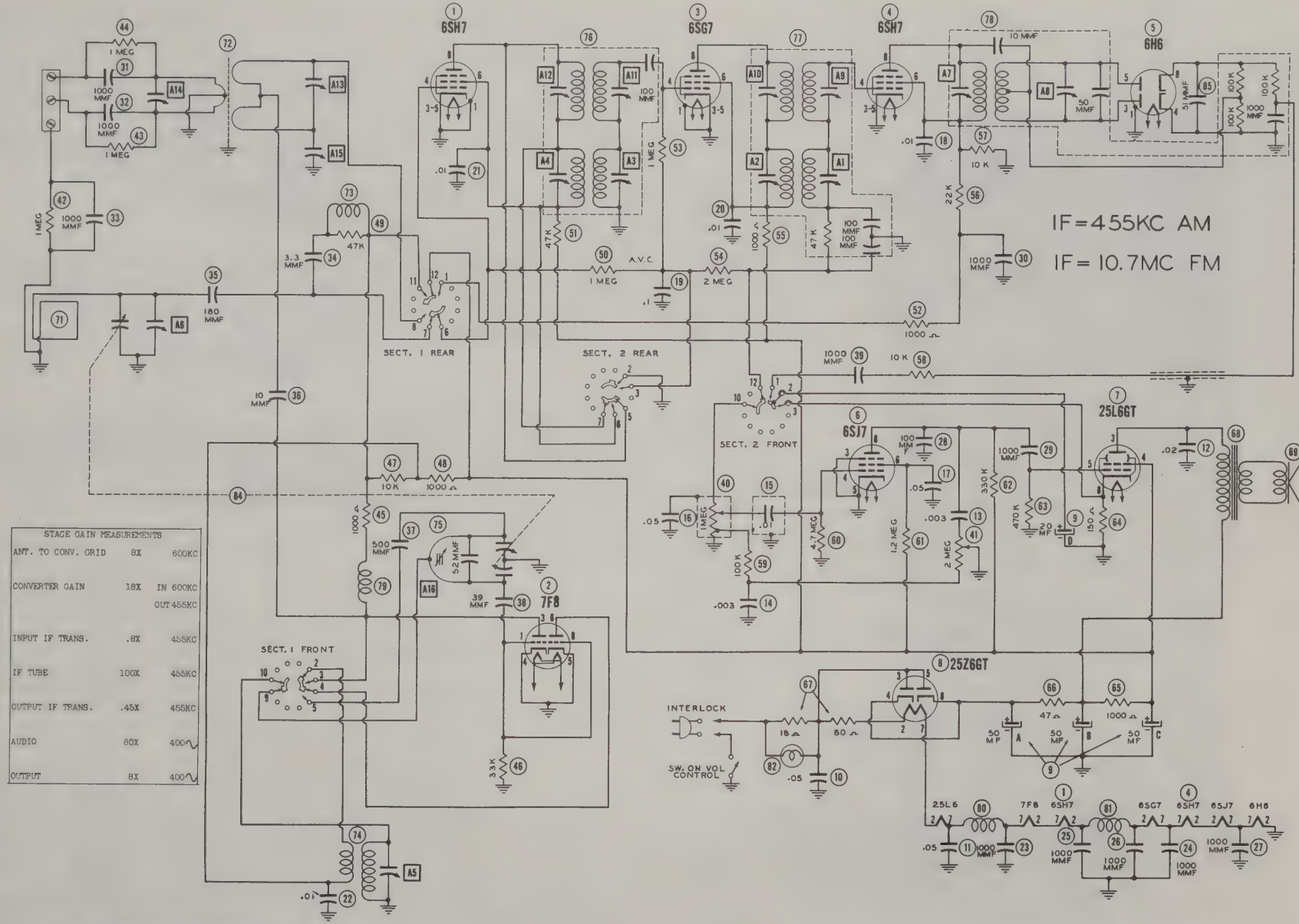
In Step 10 field strength meter may consist of DC 100 microampere (full scale) meter shunted with 1000 MMFD bypass capacitor and a germanium crystal rectifier connected in series with meter and one side of 5 ft. 75Ω twisted pair of leads. The other side of twisted pair goes to other side of meter. Connect 75Ω carbon resistor across meter end of twisted pair. Open ends of twisted pair connected to FM dipole terminals.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
4	30 MMFD	High side to Pin 4 (grid) 6SG7 1st IF Tube (2). Low side to chassis.	10.7MC (freq. modulated)	FM (clockwise)	Tuning cap. fully closed	Vertical input to Point (B). Ground to chassis.	A7,A8, A9,A10	Adjust for maximum amplitude and straightness of diagonal line of pattern of Fig. 1 with peaks occurring 75-85KC either side of center of diagonal line.
5	30 MMFD	Across FM dipole terminals.	"	"	"	"	A11,A12	"
						OUTPUT METER		
6	2 39Ω carbon res.	Each side in series with 39Ω resistor to FM dipole terminals.	98MC (freq. modulated)	FM (clockwise)	Tune for maximum output.	Across voice coil	A13	Shunt A14 with 10Ω carbon resistor. Adjust A13 for maximum output.
7	"	"	"	"	"	"	A14	Transfer shunt to A13. Adjust A14 for maximum output.
8		Replace sig. gen. with field strength meter as per prealignment instructions.	92MC	"	"	"	A15	Adjust for null point on field strength meter. If this adjustment required more than ½ turn of A15 repeat Steps 7 & 8.
9	2 39Ω carbon res.	Remove field strength meter & reconnect sig. gen. as in Step 6.	98MC	"	98MC	"	A16	Adjust for maximum deflection.

FIG. 1

FIG. 2

FOR AM ALIGNMENT SEE FRONT PAGE OF THIS FOLDER.



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

488-3

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

DELCO
MODEL R-1238

DELCO
MODEL R-1238

DELCO MODEL R-1238

TRADE NAME	Delco, Model R-1238
MANUFACTURER	United Motors Service, Div. of G. M. C., General Motors Bldg., Detroit 2, Mich.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (Five)	Types 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF. 50L66T Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1720KC RATING .24Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD. capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning capacitor Low side to B-.	456KC	Tuning capacitor fully open.	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	200MMFD	High side to ext. ant. lead. Low side to B-.	1720KC	Tuning capacitor fully open.	Across voice coil	A5	Adjust for maximum output.
3	200MMFD	High side to ext. ant. lead. Low side to B-.	1400KC	Tune for maximum output.	Across voice coil	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 4/48-#488-4 SET #38-FOLDER #4

PARTS LIST AND DESCRIPTIONS

DELCO MODEL R-1238S

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: DELCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: DELCO PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	J908	TA-440	PRSA150-40-	EDL4415	DSB-2X40-	Filter - Red
B	40	150			40		150	Filter - Blue
7	.05	600	E503	TC-15	484-05	DT6S5	ST-6-05	Rectifier Bypass
8	.01	600	E103	TC-11	484-01	DT6S1	ST-6-01	Output Plate Bypass
9	.005	600	E502	TC-25	484-005	DT6D5	ST-6-005	Audio Coupling
10	.005	600	E502	TC-25	484-005	DT6D5	ST-6-005	" "
11	.05	200	E503	TC-15	484-05	DT2S5	ST-4-05	AVC Filter
12	.05	200	E503	TC-15	484-05	DT2S5	ST-4-05	Ext.Ant. Coupling
13	.2	400	E204	TC-2	484-.2	DT4P2	ST-4-2	Line Isolation
14	470	500	G471	1FM-35	1468-0005	5W5T5	MO.5-35	AF Plate Bypass
15	470	500	G471	1FM-35	1468-0005	5W5T5	MO.5-35	RF Coupling

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DELCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
16A	500KΩ	½	1217893	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 16A per instructions.
C	Switch		Not Req.	47	SW-A6	" " " " "

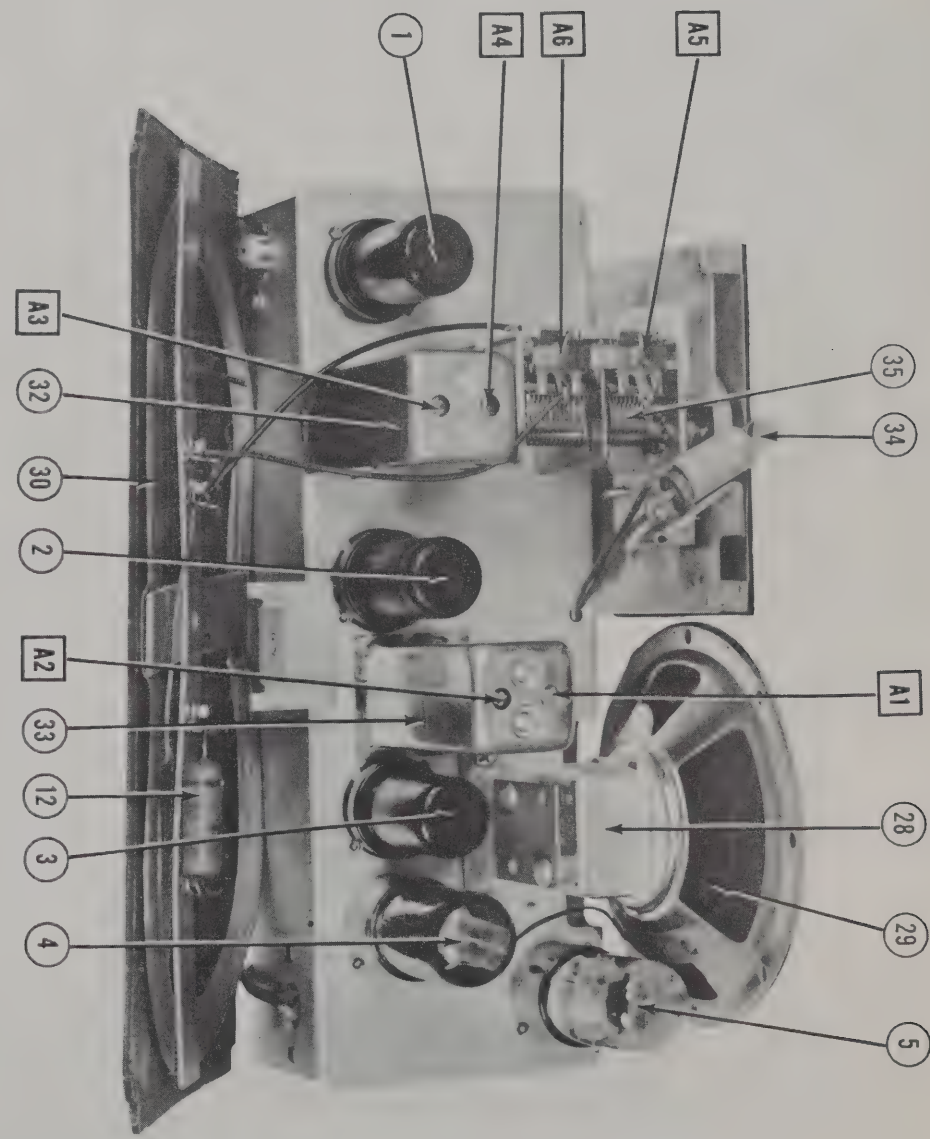
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DELCO PART No.	IRC PART No.	IDENTIFICATION CODES
17	22KΩ	½	1214550	BTS-22K	Red-Red-Or. Oscillator Grid
18	3.3 Meg.	½	1214564	BTS-3.3 Meg.	Or.-Or.-Grn. Converter Grid
19	3.3 Meg.	½	1214564	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
20	6.8 Meg.	½	1214563	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
21	220KΩ	½	1214558	BTS-220K	Red-Red-Yl. AF Plate Load
22	470KΩ	½	1214559	BTS-470K	Yl.-Vi.-Yl. Output Grid
23	150Ω	1	1213220	BW-1-150	Br.-Grn.-Br. Output Cathode
24	1000Ω	1	1211037	RTA-1000	Br.-Blk.-Red Filter
25	2.2MΩ	½	1214555	BTS-220K	Red-Red-Yl. Line Isolation
26	75Ω	2	1213224	BW-2-75	Or.-Or.-Blk. Rectifier Ballast

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.*	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: DELCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
27	2300Ω	3.4Ω	215Ω	.6Ω	1217894	A-3876	T22145	A-2928	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			DELCO PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-105†		
28A B	PM	3.4Ω	1217362 1216563	Mod.P5-X	5A1†	†Fabricate New Mounting Bracket. Alternate Speaker
	CONE DIA.	VC DIA.				
29	4-3/4"	1/2"				

R F COILS

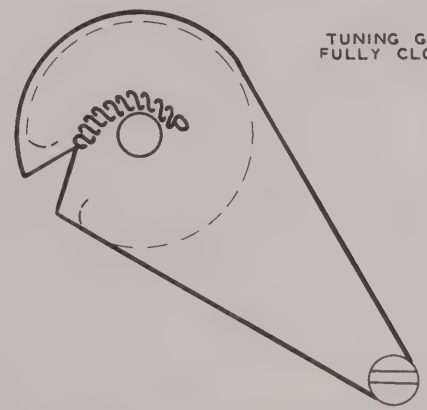
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	DELCO PART No.	MEISSNER PART No.	
30	Loop Ant.	.1Ω	1.2Ω	1217910		
31	Osc. Coil	.5Ω	5Ω	1217905	14-1060†	†Add 50 MMFD from Osc. Grid to high side tuning capacitor.
32	Input IF	15Ω	15Ω	1217886	16-6658	
33	Output IF	15Ω	15Ω	1217887	16-6670	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					DELCO PART No.		
34	Bayonet	6-8V	0.15A	Brown	47		Type 47

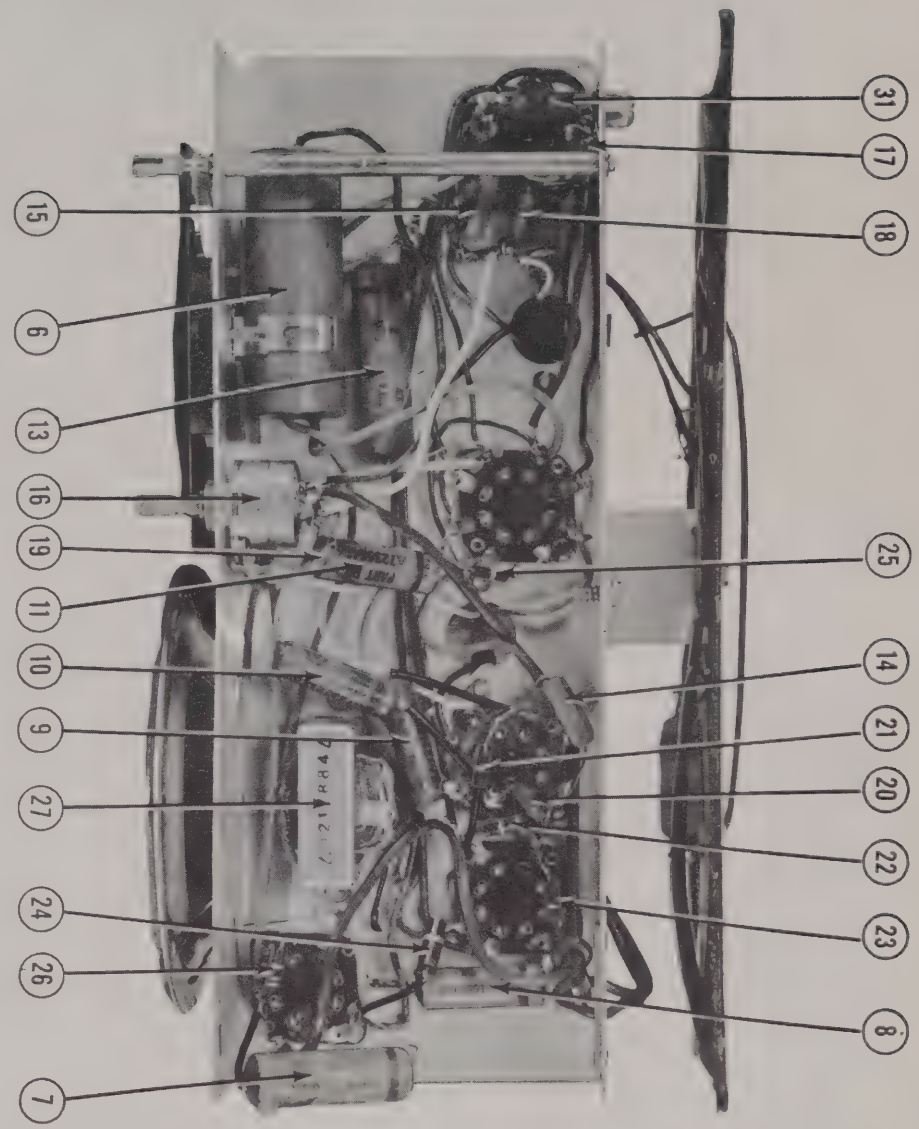
MISCELLANEOUS

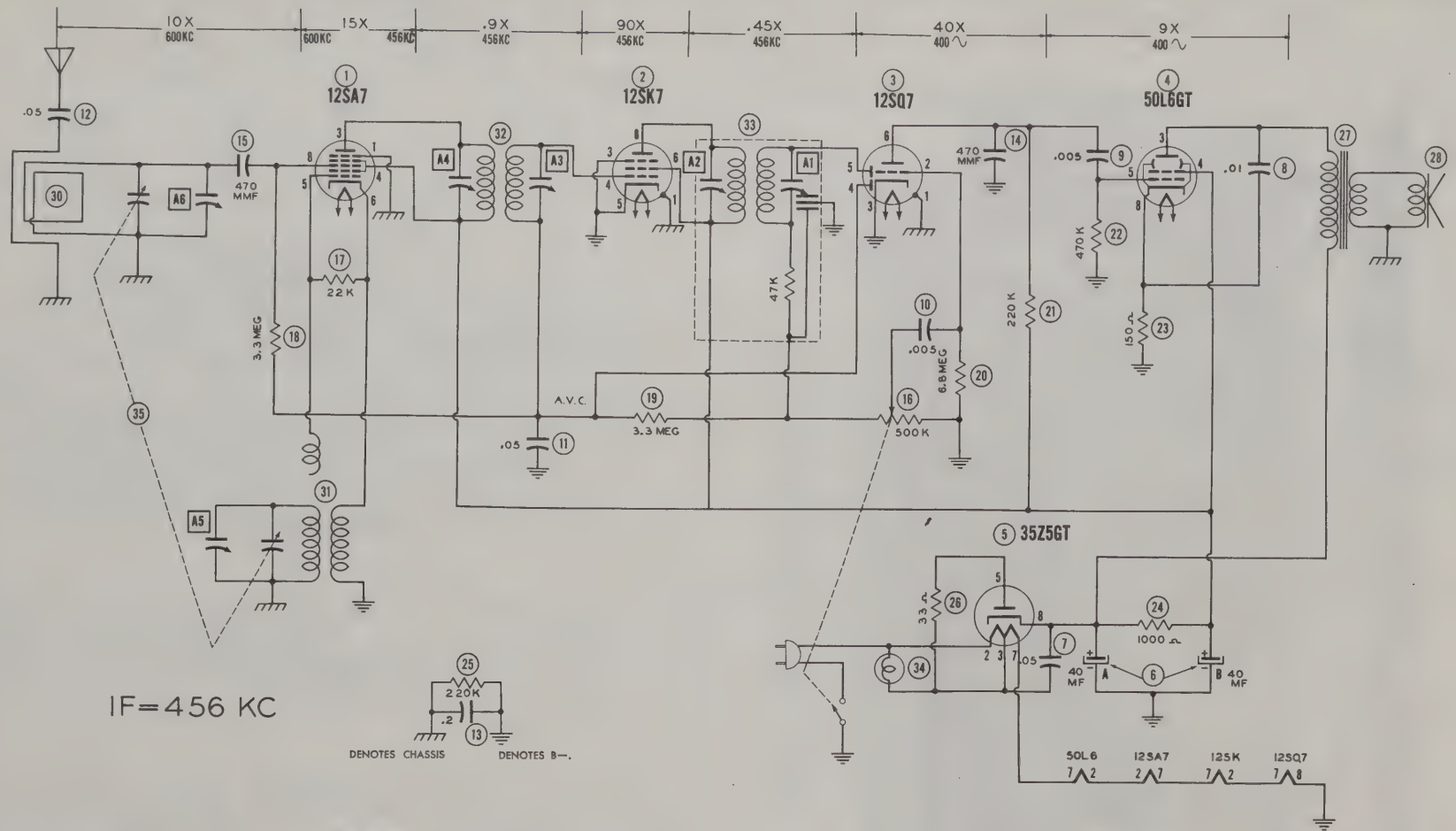
ITEM No.	PART NAME	DELCO PART No.	NOTES
35	2 Gang Var.Cap.	1217917	(21-454 MMFD, 16-192 MMFD)
	Dial	1217970	Glass
	Dial Pointer	1217891	



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	39VAC	90VDC	90VDC	-13VDC§	0V.	27VAC	0V.
2	12SK7	0V.	12VAC	0V.	-.3VDC	0V.	90VDC	27VAC	90VDC
3	12SQ7	0V.	-.4VDC	0V.	-.2VDC	-.3VDC	62VDC	12VAC	0V.
4	50L6GT	0V.	39VAC	107VDC	90VDC	0V.	0V.	89VAC	5.5VDC
5	35Z5GT	0V.	117VAC	115VAC	0V.	112VAC	0V.	89VAC	116VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	220KΩ	38Ω	300KΩ	300KΩ	2.2KΩ	.5Ω	26Ω	6.7 Meg
2	12SK7	220KΩ	12Ω	0Ω	3.4 Meg.	0Ω	300KΩ	26Ω	300KΩ
3	12SQ7	220KΩ	6.8 Meg.	0Ω	550KΩ	3.4 Meg.	520KΩ	12Ω	0Ω
4	50L6GT	220KΩ	38Ω	300KΩ	300KΩ	470KΩ	0Ω	85Ω	150Ω
5	35Z5GT	220KΩ	105Ω	105Ω	INF.	105Ω	INF.	85Ω	300KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

488-4

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

DEWALD
MODEL B-506

DEWALD
MODEL B-506

DeWALD MODEL B-506

TRADE NAME	DeWald. Model B-506
MANUFACTURER	DeWald Radio Mfg. Corp., 35-28 49th St., Long Island City, N. Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna.
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	105-125 Volts AC-DC
TUNING RANGE—BROADCAST	540-1720KC RATING .24 Amp. @ 117 Volts AC.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1		Loop	455KC	Tuning capacitor fully closed.	Across voice coil	A1,A2, A3,A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2		Loop	1720KC	Tuning capacitor fully open.	Across voice coil	A5	Adjust for maximum output.
3		Loop	1500KC	Tune for maximum output.	Across voice voil	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

DEWALD MODEL B-806

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		DeWALD PART No.	STANDARD REPLACEMENT		
1	Converter	12BE6	12BE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	12AT6	12AT6	7BT	
4	Power Output	50B5	50B5	7BZ	
5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	DeWALD PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
6A	30	150	2002	TA-330	PRSA150-30-	EZ3315	DSB-2X30-150	Filter-Yl.
B	30	150			30			Filter-Red
7	.05	400		TC-15	484-05	DT4S5	ST-4-05	Line Filter
8	.02	400		TC-12	484-02	DT4S2	ST-4-02	Output Plate Bypass
9	.05	400		TC-15	484-05	DT4S5	ST-4-05	RF Bypass Pwr. Supply
10	.01	400		TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
11	.005	400		TC-2[illegible]	484-005	DT6D5	ST-6-005	" "
12	.05	400		TC-15	484-05	DT4S5	ST-4-05	AVC Filter
13	220	500		1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass-Cer.
14	220	500		1FM-325	1468-00025	5W5T25	MO.5-325	Diode RF Filter -Cer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	DeWALD PART No.	IRC PART No.	CLAROSTAT PART No.	
15A	500KΩ	½	3002	D13-133	M-60-2	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 15A per instructions.
C	Switch		Not Req.	41	SW-A	Attach to 15A per instructions.

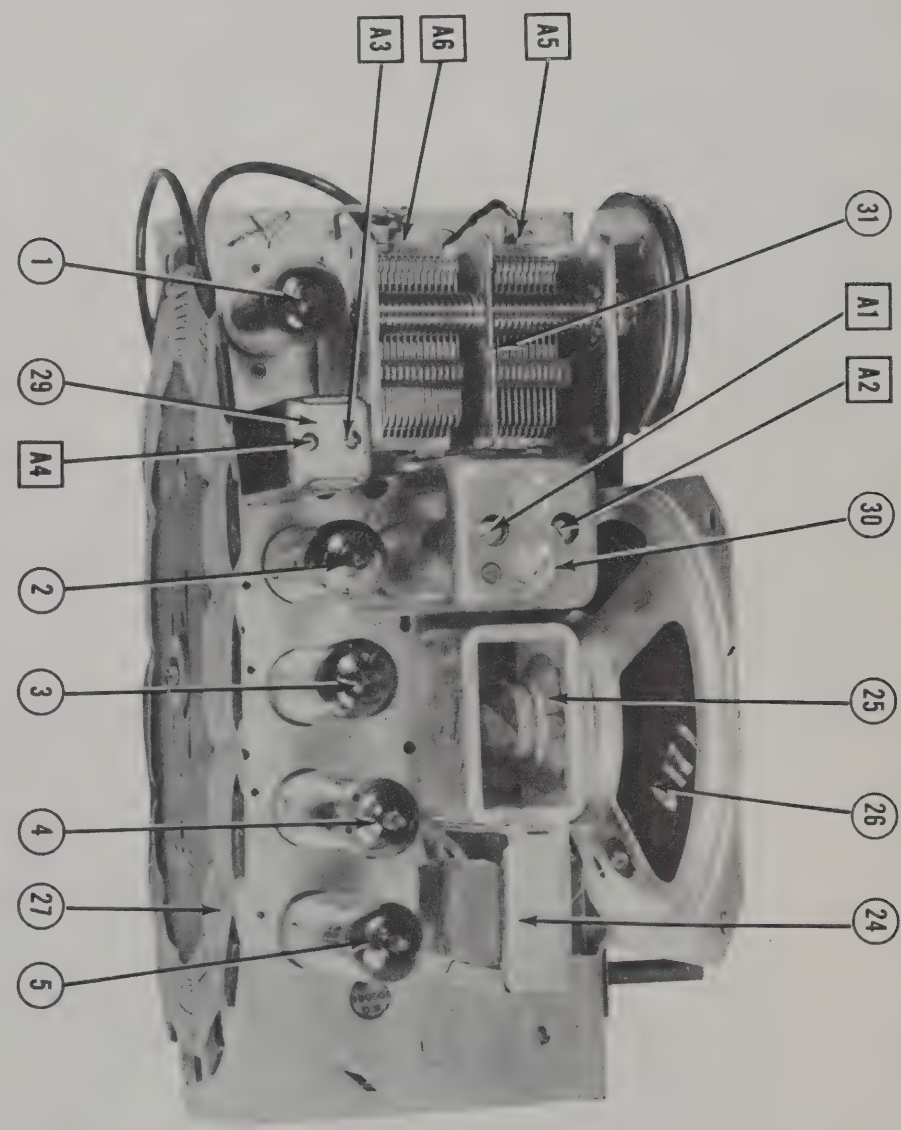
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	DeWALD PART No.	IRC PART No.	
16	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
17	150Ω	½		BW-½-150	Br.-Grn.-Br. IF Cathode
18	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
19	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
20	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AF Plate Load
21	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
22	150Ω	½		BW-½-150	Br.-Grn.-Br. Output Cathode
23	1500Ω	2		BT-2-1500	Br.-Grn.-Red Filter

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		DeWALD PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
24	8000Ω	3.0Ω	165Ω	.6Ω	Part of 7003	A-3876*	T22S45*	A-2928*	*Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

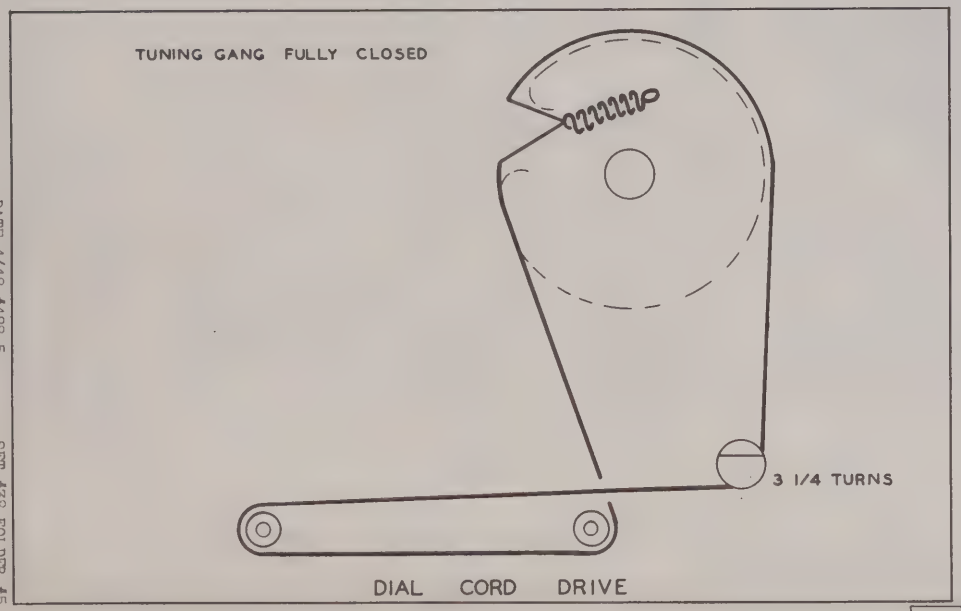
ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			DeWALD PART No.	JENSEN PART No.	QUAM PART No.	
25	FIELD PM	VC IMP. 3.0Ω	7003	ST-113 Mod.P4-X	4A07	
26	CONE DIA. 4"	VC DIA. ⅛"				

R F COILS

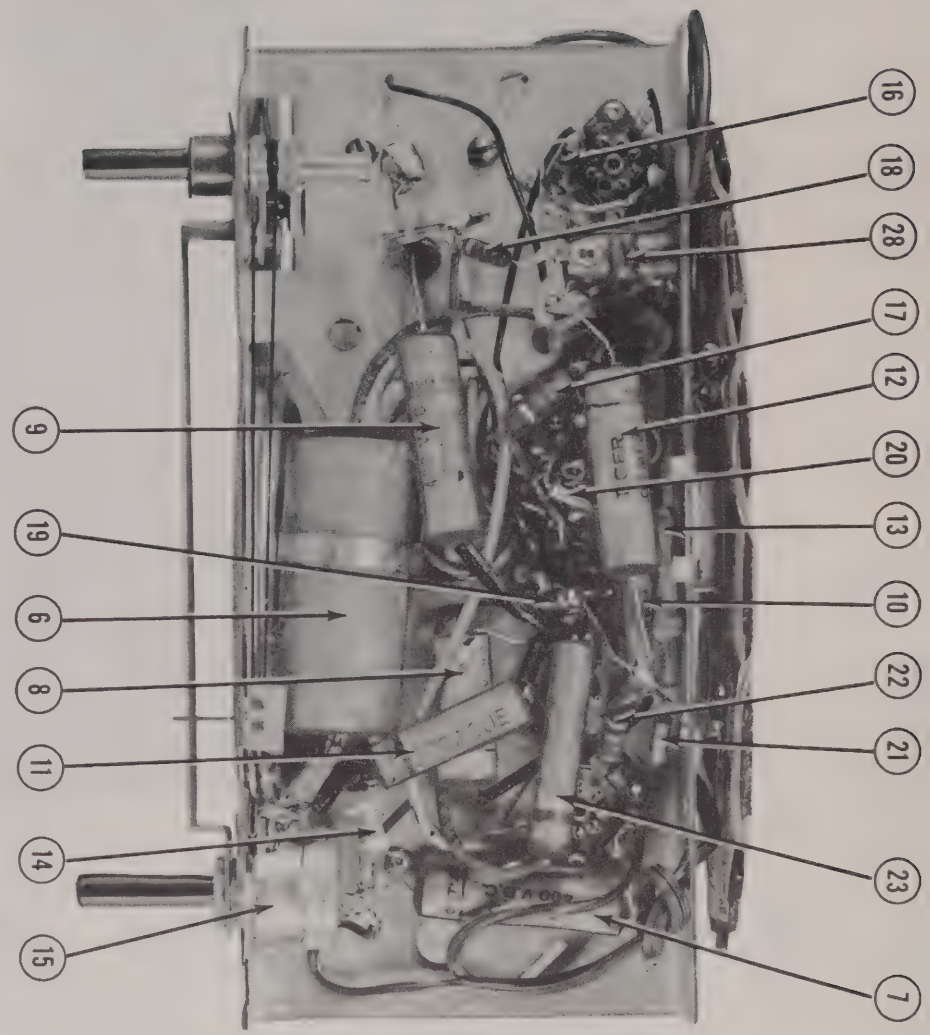
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	DeWALD PART No.	MEISSNER PART No.	
27	Loop Ant.	.1Ω	1.5Ω	1016		
28	Osc. Coil		5.5Ω	1028	14-1060†	†Add 50 MMFD from Osc. grid to high side tuning capacitor.
29	Input IF	19Ω	19Ω	1027-1	16-6678	
30	Output IF	29Ω	29Ω	1002-3	16-6660	

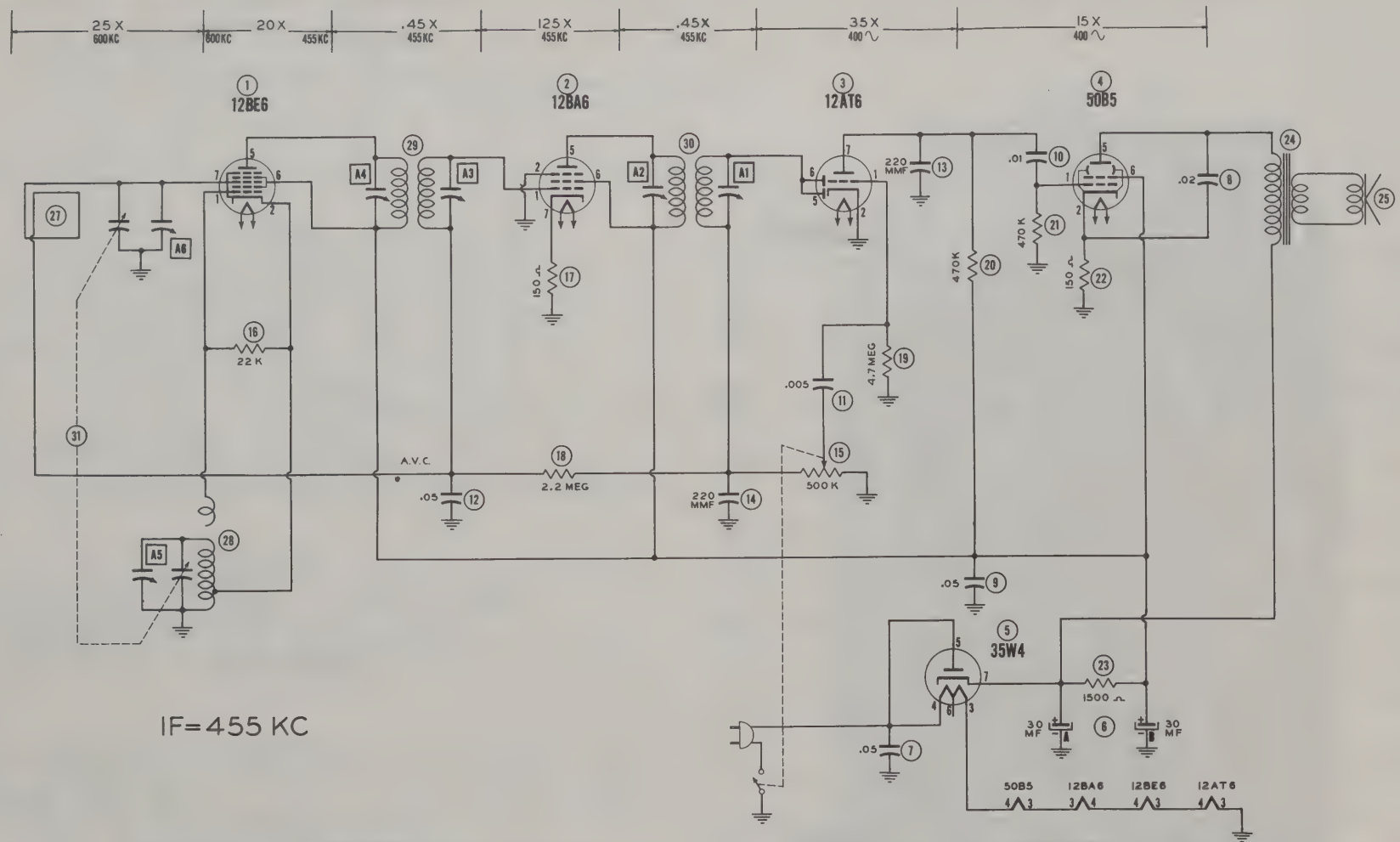
MISCELLANEOUS

ITEM No.	PART NAME	DeWALD PART No.	NOTES
31	2 Gang Var.Cap.	2003	(20-456 MMFD, 29-188 MMFD)
	Knob	4055	



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	-14VDC§	0V.	12VAC	25VAC	98VDC	98VDC	0V.
2	12BA6	0V.	0V.	37VAC	25VAC	98VDC	98VDC	1.3VDC
3	12AT6	-.7VDC	0V.	0V.	12VAC	-.5VDC	-.5VDC	50VDC
4	50B5	0V.	6.4VDC	37VAC	85VAC	127VDC	96VDC	0V.
5	35W4	0V.	0V.	85VAC	117VAC	117VAC	111VAC	132VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	22KΩ	.6Ω	12Ω	24Ω	100KΩ	100KΩ	2.7 Meg.
2	12BA6	2.7 Meg.	0Ω	35Ω	24Ω	100KΩ	100KΩ	150Ω
3	12AT6	4.7 Meg.	0Ω	0Ω	12Ω	500KΩ	500KΩ	570KΩ
4	50B5	470KΩ	150Ω	35Ω	85Ω	100KΩ	100KΩ	470KΩ
5	35W4	INF.	INF.	85Ω	118Ω	118Ω	110Ω	100KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

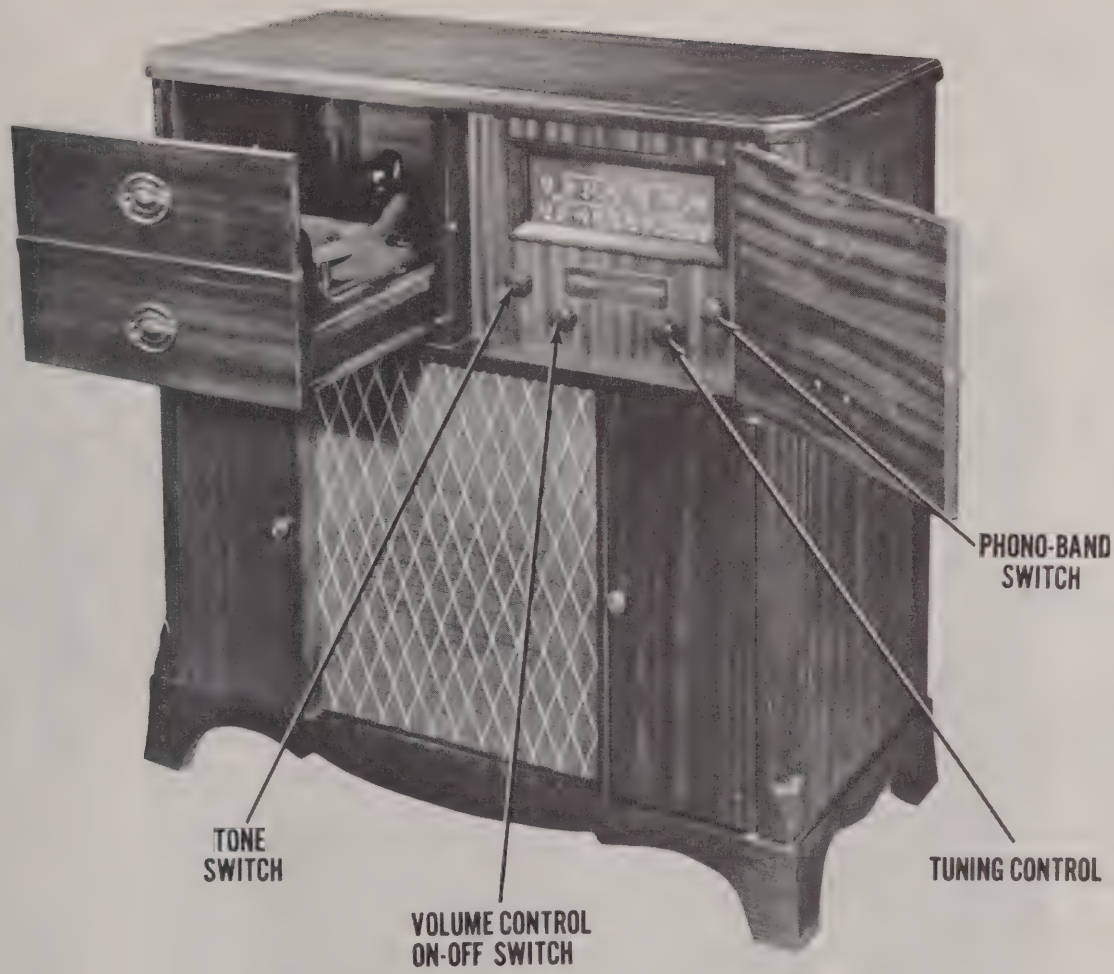
© Howard W. Sams & Co., Inc. 1948

488-5

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

FIRESTONE (AIR CHIEF) MODEL
4-A-60 (Code #307-8-9047A)



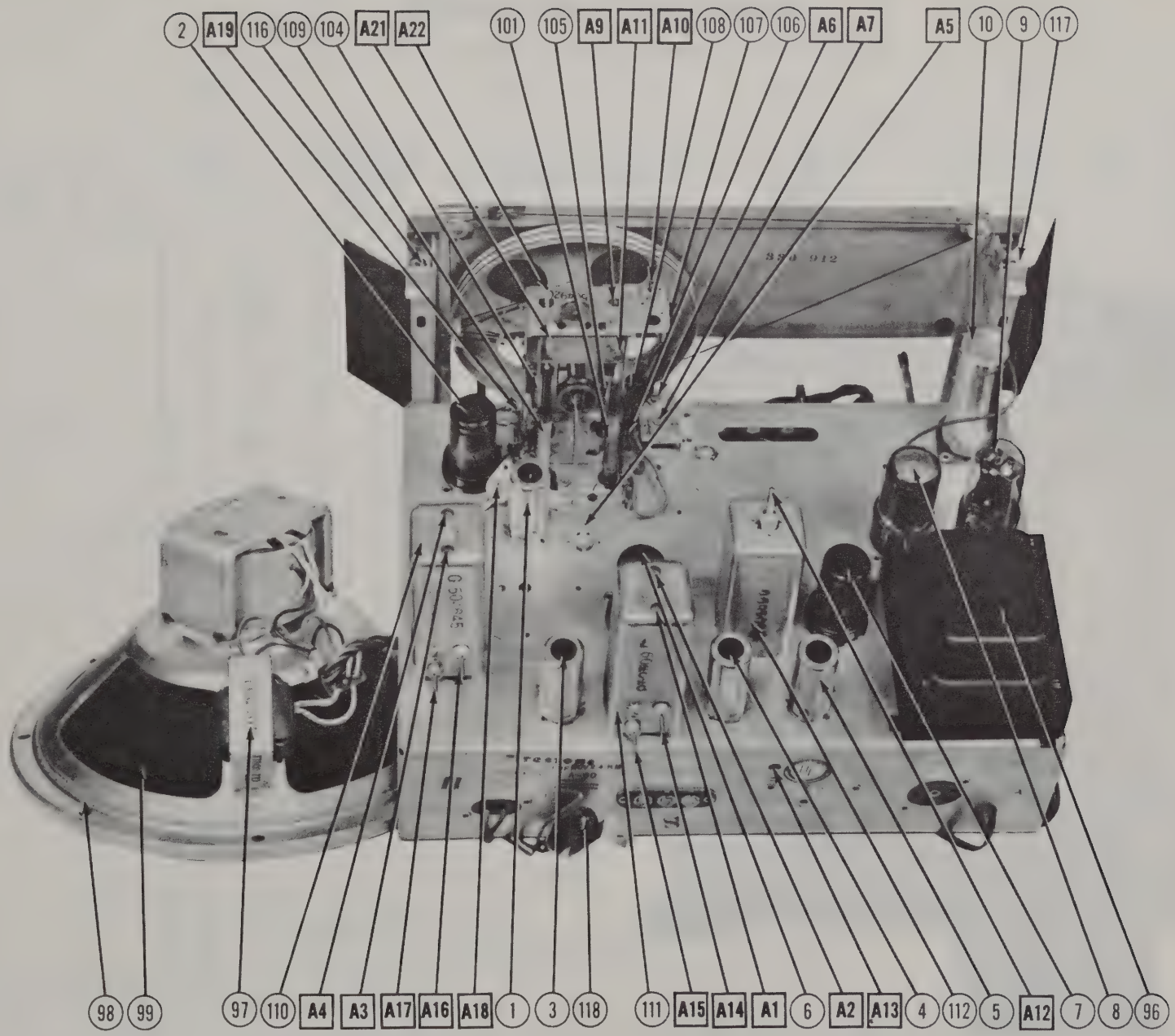
FIRESTONE (AIR CHIEF) MODEL
4-A-60 (Code #307-8-9047A)

AIR CHIEF MODEL 4-A-60

TRADE NAME	Firestone (Air Chief), Model 4-A-60 (Code #307-8-9047A)
SUPPLIER	Firestone Tire & Rubber Co., Akron, Ohio
TYBE SET	AC Operated Combination Phono-Radio AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (NINE)	Types, 6BA6 RF Amp., 6SB7Y Converter, 6BA6 1st IF Amp., 6BA6 FM 2nd IF Amp., 6AL5 Ratio Det., 6SQ7 AM Det.-AVC, FM AF, 6SJ7 AF Amp., 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC RATING .9 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1600KC FREQ. MOD. 88-108MC

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America


2
A19
116
109
104
A21
A22
101
105
A9
A11
A10
108
107
106
A6
A7
A5
10
9
117
98
99
97
110
A4
A3
A17
A16
A18
1
3
118
111
A15
A14
A1
6
A2
A13
4
112
5
A12
7
8
96

A8

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		FIRESTONE PART No.	STANDARD REPLACEMENT		
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6SB7Y	6SB7Y	8R	
3	1st IF Amp.	6BA6	6BA6	7BK	
4	FM 2nd IF Amp.	6BA6	6BA6	7BK	
5	Ratio Detector	6AL5	6AL5	6BT	
6	AM Det.-AVC, FM AF	6SQ7	6SQ7	8Q	
7	AF Amp.	6SJ7	6SJ7	8N	
8	Power Output	6V6GT	6V6GT	7AC	
9	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	FIRESTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
10A	20	450	161193	AF44J4A	UP2245C	DY-312	EL-205	■ Filter
B	15	450						▲ "
C	10	25						" Output Cathode Bypass
11	4	450	504179	PRS450-4	BR445	M-4-450	UT-4	AF Plate Decoup.
12	16	400	505150	PRS450-16	BR1645	M-16-450	UT-16	Filter
13	16	400	505150	PRS450-16	BR1645	M-16-450	UT-16	"
14	4	450	504179	PRS450-4	BR445	M-4-450	UT-4	AF Decoupling
15	5	50		PRS150-4	BR550	M-4-450	TA-55	Stabilizing Cap.
16	.01	400	502804	464-01	DT4S1	MPH-4-01	TC-11	Line Filter
17	.01	400	502804	464-01	DT4S1	MPH-4-01	TC-11	" "
18	.006	600	502479	684-006	DT6D6	ST-6-006	TC-26	Output Plate Bypass
19	.02	400	502152	464-02	DT4S2	ST-4-02	TC-12	Audio Coupling
20	.01	600	502261	684-01	DT6S1	ST-6-01	TC-11	Tone Compensation
21	.25	400	502405	464-.25	DT4P25	ST-4-25	TC-2	" "
22	.004	600	502150	684-004	DT6D4	ST-6-004	TC-24	Audio Coupling
23	.01	600	502261	684-01	DT6S1	ST-6-01	TC-11	" "
24	.01	600	502261	684-01	DT6S1	ST-6-01	TC-11	Phono Tone Comp.
25	.05	400	502157	464-05	DT4S5	ST-4-05	TC-15	Tone Compensation
26	.01	600	502261	684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
27	.01	600	502261	684-01	DT6S1	ST-6-01	TC-11	2nd IF Plate Decoup.
28	.01	600	502261	684-01	DT6S1	ST-6-01	TC-11	2nd IF Screen Bypass
29	.01	600	502261	684-01	DT6S1	ST-6-01	TC-11	1st IF Plate Decoup.
30	.01	600	502261	684-01	DT6S1	ST-6-01	TC-11	1st IF Screen Bypass
31	.05	200	502153	464-05	DT2S5	ST-4-05	TC-15	AVC Filter
32	.01	600	502261	684-01	DT6S1	ST-6-01	TC-11	Conv. Plate Decoup.
33	.01	600	502261	684-01	DT6S1	ST-6-01	TC-11	Conv. Screen Bypass
34	.02	200	504725	464-02	DT2S2	ST-4-02	TC-12	AVC Filter
35	.05	200	502153	484-05	DT2S5	ST-4-05	TC-15	" "
36	.01	600	502261	684-01	DT6S1	ST-6-01	TC-11	RF Plate Decoup.
37	.05	150	504447	484-05	DT2S5	ST-4-05	TC-15	RF Cathode Bypass
38	.01	600	502261	684-01	DT6S1	ST-6-01	TC-11	RF Coupling
39	260	500	502271	1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass-Cer.
40	150	500	502202	1468-00015	5W5T15	MO.5-315	1FM-315	Diode Load Cap.-Cer.
41	500	500	504727	1468-0005	5W5T5	MO.5-35	1FM-35	AVC Filter
42	100	500	502931	1468-0001	5W5T1	MO.5-31	1FM-31	Diode Filter-Cer.
43	15	500	504733		5W5Q2	MOS.5-42	MS-415	Osc. Grid Cap.-Cer.
44	47	500	502929	1468-00005	5W5Q5	MOS.5-45	1FM-45	" " "
45	5	500	504905	1469-000005	5R5V5	MOS.5-55	MS-55	Fixed Pad - Cer.
46	47	500	502929					Fixed Trimmer
47	47	500	502929	1468-00005	5W5Q5	MO.5-45	1FM-45	RF Coupling
48	39	500	504659					Fixed Pad-Cer.
49	100	500	502931	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling-Cer.
50	1000	500	504724	1467-001	1W5D1	MW.5-21	1FM-21	RF Screen Bypass-Cer.
51	30	500	504723		5R5Q3	MOS.5-43	1FM-43	Fixed Trimmer
52	100	500	502931	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling - Cer.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		FIRESTONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
97A	5200Ω	3.4Ω	300Ω	.4Ω	505304	A-3825	T22587	A-2502	
B					502994				Used with Speaker M-502302.
C					505029				Used with Speaker E-502302.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			FIRESTONE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD RES.	VC IMP.		ST-745#		†Replace output transformer to match
98A	1000Ω	3.4Ω	0-502302	Mod. F10-S	10E10†	6-8Ω voice coil.
						#Add 250Ω in series with field coil.
B			M-502302			Alternate Speaker
C			E-502302			" "
	CONE DIA.	VC DIA.				
99	10"	7/8"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	
100	Loop Ant.		1.7Ω	505668		
101	BC Ant.Coil		10Ω	505151		
102	Wave Trap		26Ω	504670		
103	FM Ant.Coil	0Ω	0Ω	504692		
104	FM RF Coil		0Ω	505159		
105	BC Osc.Coil		3.5Ω	505153		
106	BC Osc. Series Coil		.1Ω	505157		
107	BC Osc. Shunt Coil		5.5Ω	505155		
108	BC Osc. Comp. Coil		INF.	505158		
109	FM Osc.Coil		0Ω	505159		
110A	1st AM IF	18Ω	18Ω*	504645		*Includes both secondaries.
B	1st FM IF	1.5Ω				
111A	2nd AM IF	23‡	17Ω	504646		‡Includes both primaries.
B	2nd FM IF		1Ω			
112	Ratio Det. Trans.	1.2Ω	.5Ω	504690		
113	Plate Chk.		.1Ω	504675		
114	Cath. Chk.		.1Ω	504675		
115	Fil. Choke		.1Ω	504675		
122	FM Antenna		0Ω	504895		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					FIRESTONE PART No.		
116-119	Bayonet	6-8	0.25	Blue	110629		Type 44

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	FIRESTONE PART No.	IRC PART No.	CLAROSTAT PART No.	
53A	500KΩ	½	502148	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KS8-3	Attach to 53A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	FIRESTONE PART No.	IRC PART No.	
54	680KΩ	½	502267	BTS-680K	Blue-Gray-Yl. RF Grid
55	560KΩ	½	504907	BTS-560K	Grn.-Blue-Yl. AVC Network
56	68Ω	½	502794		Blue-Gray-Blk. RF Cathode
57	33KΩ	1	502466	BTA-33K	Or.-Or.-Or. RF Screen Dropping
58	2200Ω	½	502138	BTS-2200	Red-Red-Red RF Plate Decoupling
59	1500Ω	½	502406	BTS-1500	Br.-Grn.-Red RF Plate Load
60	22KΩ	½	502130	BTS-22K	Red-Red-Or. Converter Grid
61	22KΩ	½	502130	BTS-22K	Red-Red-Or. " "
62	22KΩ	½	502130	BTS-22K	Red-Red-Or. Oscillator Grid
63	470KΩ	½	502134	BTS-470K	Yl.-Vi.-Yl. AVC Network
64	2200Ω	½	502128	BTS-2200	Red-Red-Red Converter Plate Decoupling
65	33KΩ	1	502466	BTA-33K	Or.-Or.-Or. 1st IF Screen Dropping
66	2200Ω	½	502128	BTS-2200	Red-Red-Red 1st IF Plate Decoupling
67	47KΩ	½	502131	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
68	680KΩ	½	502267	BTS-680K	Blue-Gray-Yl. AVC Network
69	220KΩ	½	502133	BTS-220K	Red-Red-Yl. AVC Network
70	2.2 Meg.	½	502135	BTS-2.2 Meg.	Red-Red-Grn. " "
71	33KΩ	1	502466	BTA-33K	Or.-Or.-Or. 2nd IF Screen Dropping
72	2200Ω	½	502128	BTS-2200	Red-Red-Red 2nd IF Plate Decoupling
73	3300Ω	½	502514	BTS-3300	Or.-Or.-Red De-emphasis
74	10 Meg.	½	502136	BTS-10 Meg.	Br.-Blk.-Blue 1st AF Grid
75	100KΩ	½	502132	BTS-100K	Br.-Blk.-Yl. 1st AF Plate Load
76	330KΩ	½	502882	BTS-330K	Or.-Or.-Yl. 1st AF Plate Decoupling
77	22KΩ	½	502130	BTS-22K	Red-Red-Or. Ratio Detector Diode Load
78	100KΩ	½	502132	BTS-100K	Br.-Blk.-Yl. Series Phono
79	68KΩ	½	502408	BTS-68K	Blue-Gray-Or. Phono Tone Compensation
80	12KΩ	2	504731	BT-2-12K	Br.-Red-Or. Converter Screen Dropping
81	4.7 Meg.	½	502468	BTS-4.7 Meg.	Yl.-Vi.-Grn. 2nd AF Grid
82	1000Ω	½	502478	BTS-1000	Br.-Blk.-Red 2nd AF Cathode
83	2.2 Meg.	½	502135	BTS-2.2 Meg.	Red-Red-Grn. 2nd AF Screen Dropping
84	220KΩ	½	502133	BTS-220K	Red-Red-Yl. 2nd AF Plate Load
85	1000Ω	½	502478	BTS-1000	Br.-Blk.-Red Decoupling
86	4.7 Meg.	½	502468	BTS-4.7 Meg.	Yl.-Vi.-Grn. Tone Compensation
87	47KΩ	½	502131	BTS-47K	Yl.-Vi.-Or. " "
88	4700Ω	½	502291	BTS-4700	Yl.-Vi.-Red " "
89	12KΩ	2	504731	BT-2-12K	Br.-Red-Or. Voltage Dropping
90	470KΩ	½	502134	BTS-470K	Yl.-Vi.-Yl. Output Grid
91	47Ω	1	504454	BW-1-47	Yl.-Vi.-Blk. Parasitic Suppressor
92	470Ω	½	502130	BTS-470	Yl.-Vi.-Br. Tone Compensation
93	130Ω	2	504729	BW-2-120	Br.-Or.-Br. Bias Network
94	11Ω	½	504728	BW-½-10	Br.-Br.-Blk. Bias Network
95	68Ω	½	502794		Blue-Gray-Blk. 2nd IF Cathode

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	FIRESTONE PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
96	117V AC @ .9A	700V CT @ .110A	5.1V AC @ 2.0A	6.3V AC @ 3.5A	504643	P-6013	T22R05	P-2953

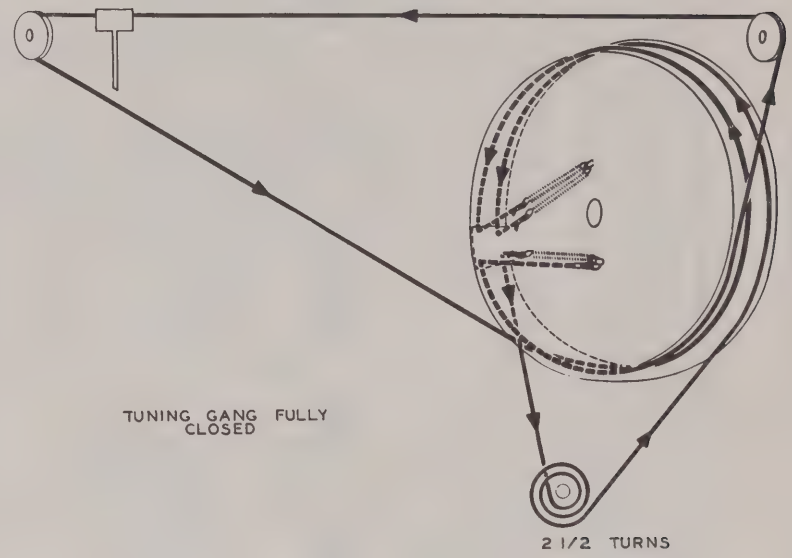
PARTS LIST AND DESCRIPTIONS (Continued)

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA		REMARKS
	FIRESTONE PART No.	ASTATIC PART No.	
119	502461	L-71-A	L-71 original part.

MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
120	Switch	504593	FM-AM-Phono
121	"	504592	Tone
A6 }	Dual Trimmer	504712	{ BC Osc. Adj.
A7 }			{ BC Ant. Adj.
A8	Trimmer	504956	BC Ant. Adj.
A13	"	504662	FM Rat. Det. Adj.
A18	"	502757	FM Osc. Adj.
A19	"	502757	FM RF Adj.
A20	"	504663	FM Ant. Adj.
	Dial Scale	506147	
	Dial Pointer	504838	
	Needle	502460	Phonograph



DIAL CORD DRIVE

DATE 4/4/5-#488-S

SET #23-FOLDER #4

AM ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Disconnect leads from FM antenna terminal strip at back of chassis; also disconnect all other plugs on rear of chassis and remove chassis from cabinet. Remove speaker from cabinet and reconnect plug to chassis. Remove the AM Loop Antenna.

If alignment of both AM & FM channels is required it is necessary to align the AM channel first, then align the FM channel.

Do not attempt to reposition pointer by releasing it from clip on dial cord except during AM alignment (Step 4). If pointer is moved it will necessitate re-alignment of the RF section of the FM channel (Steps 17-19).

For AM alignment wind one turn of insulated wire around frame of the loop to provide coupling to the signal generator. Keep loop in same relative position to the chassis as when mounted in cabinet during AM alignment.

Dress leads from slug tuner assembly and pushbutton switch away from the wave trap coil and close to the chassis.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

After chassis is mounted in cabinet spread the loop leads as much as possible. Do not twist or tape these leads together.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to ungrounded side of trimmer A7. Low side to chassis.	455KC	BC (center position)	Any position where interfering signal is not received.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. Repeat adjustments.
2	.1 MFD.	"	"	"	"	"	A5	Adjust for minimum output.
	If position of AM Tuner Slugs have been disturbed or if coil or slug has been replaced omit Steps 3-6 inclusive and proceed with Step 7. If not, proceed with Step 3.							
3	500MMF Mica.	Connect to coupling turn on loop. (See prealignment instructions)	535KC	BC (center pos.)	Set slug tuner fully closed.	Across voice coil	A6	Adjust for maximum output.
4	"	"	1000KC	"	Tune for maximum output.	"		Pointer should be under 1000KC.calibration mark. (Wide mark slightly to right of 100). If it is not, release clip on pointer and set to correct mark.
5	"	"	1500KC	"	"	Across voice coil	A7	Note position of pointer. If it is not more than 20KC from 1500KC mark, adjust A7 for maximum output. If it is more than 20KC off omit next step and proceed with Step 7.
6	"	"	600KC	"	"	"	A8	Adjust for maximum output. Try to increase output by detuning A8 and retuning receiver until maximum output is obtained. Repeat Steps 5 & 6 until no further increase can be obtained. This completes BC band alignment. The following steps under "Slug Tuner Adjustments". should be made only where conditions described previously were encountered.

AM SLUG TUNER ADJUSTMENTS

This procedure is to be used only where the positions of slugs in the slug tuner have been disturbed or in event of a coil or slug replacement, or where a serious calibration or tracking error is noted after attempting to align the receiver as described in the preceding section.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
7	500MMF. Mica.	Connect to coupling turn on loop.	535KC	BC	Set slug tuner fully closed.	Across voice coil	A9	Back out A6 to minimum capacity. Rotate A9 and note whether peak can be obtained. If not, tighten A6 slightly and adjust A9 for maximum. Always rotate A9 so that core is moving down. The purpose of this adjustment is to resonate coil and capacitor at the lowest capacity position of A6.
8	"	"	1500KC	"	1500KC	"	A6	Adjust for maximum output.
9	"	"	535KC	"	Set slug tuner fully closed.	"	A10	Adjust for maximum output. Repeat Steps 8 and 9 until both points are correctly calibrated.
10	"	"	1500KC	"	Tune for maximum output.	"	A7	Adjust for maximum output
11	"	"	1000KC	"	"	"	A11	" " " "
12	"	"	600KC	"	"	"	A8	Adjust for maximum output Try to increase output by detuning A8 and retuning receiver until maximum output is obtained. Repeat Steps 10, 11 & 12 until no further improvement can be made. Apply speaker cement to top of each AM tuning slug.

FM ALIGNMENT INSTRUCTIONS

Disconnect leads from FM antenna terminal strip (labelled "A-G-A") at back of chassis; also disconnect all other plugs on rear of chassis and remove chassis from cabinet. It is not necessary to remove the built in FM antenna.

Remove speaker from cabinet and reconnect plug to receiver chassis.

It is preferable to use an FM signal generator and an oscilloscope for FM alignment. However, if this equipment is not available a reasonably accurate alignment may be obtained using a conventional AM signal generator and vacuum tube voltmeter providing proper care is exercised in adjusting the discriminator circuit trimmer.

Use only a signal generator which produces fundamental frequencies at 10.7MC and 88 to 108 MC. Signal generators which rely on the third, fourth or fifth harmonics to produce these signals produce beat signals with the local oscillator making alignment difficult.

Remove the metal shield in the vicinity of the IF stages used on some sets. Dress FM circuit leads as short and straight as possible, particularly in the oscillator circuit. IF plate and grid leads should also be kept short and straight.

FM ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

If the internal sawtooth generator (120 cps) of the oscilloscope is used for horizontal deflection a pattern similar to that of Fig. 1 should be obtained. If the properly phased 60~ sine wave sync. voltage from the FM signal generator is used for horizontal deflection a pattern similar to that in Fig. 2 should be obtained. Frequency modulate signal with 60~, 300KC deviation.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
13	.01 MFD.	High side to Pin #1 of 6BA6 2nd IF Tube #4. Low side to chassis near same tube.	10.7MC (Modulated ± 300KC)	FM (clock-wise)	Any position where interfering signal is not received.	High side vertical amp. in series with .1 MFD. to Point A. Low side to chassis	A12	Adjust A13 for pattern similar to Fig. 1 or Fig. 2 depending on type of sweep used. (See prealignment instructions). Then adjust A12 for maximum amplitude and steepness of that portion of the curve between A & C.
14	.01 MFD.	"	"	"	"	"	A13	Adjust until cross-over point B is centrally located in both horizontal and vertical directions. Also the portion of the curve between A & C should be as straight as possible. Recheck settings of A12 & A13 for greater accuracy.
15	.01 MFD.	High side to Pin #1 of 6BA6 1st IF Tube #3. Low side to chassis near same tube.	"	"	"	"	A14,A15	Adjust for maximum amplitude and steepness of that portion of the curve between A & C.
16	.01 MFD.	High side to junction of A19 and FM RF coil. Low side to chassis near tuner unit.	"	"	"	"	A16,A17	Adjust for maximum amplitude and steepness of pattern. If the enlarged pattern indicates a lack of symmetry, readjust A13 for correct crossover point.
	If position of FM tuner slugs have been disturbed or if coil or slug has been replaced omit Steps 17-19 inclusive and proceed with Step 20. If not, proceed with Step 17.							
17	150Ω & 120Ω carbon res.	High side to "A" terminal at rear of chassis in series with 120Ω. Low side to other "A" terminal in series with 150Ω.	98MC (modulated ± 300KC)	FM (clock-wise)	98MC	High side vertical amp. in series with .1 MFD to Point A Low side to chassis	A18	Adjust for symmetrical pattern. Correct setting will give centrally located cross-over point.
18	"	"	"	"	"	"	A19	Adjust for maximum amplitude of pattern. Recheck A16 and A17 for maximum amplitude and symmetry of pattern.
19	"	"	90MC (Modulated ± 300KC)	"	Tune 90MC signal.	"	A20	Adjust for maximum amplitude of pattern. Check calibration at 88MC and 108MC. If within .4MC alignment is satisfactory. If greater than .4MC perform Steps 20, 21 and 22.

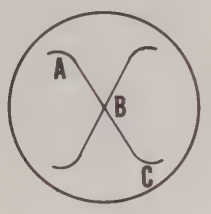


FIG 1

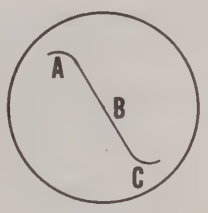
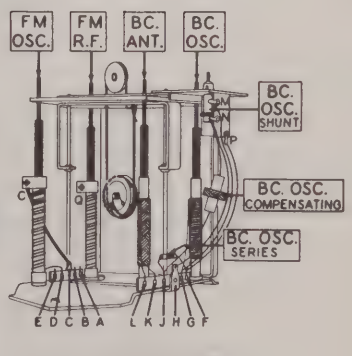


FIG 2

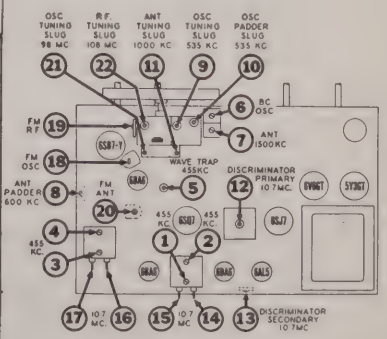
FM SLUG TUNER ADJUSTMENTS

This procedure is to be used only where the positions of slugs in the slug tuner have been disturbed or in event of a coil or slug replacement, or where a serious calibration or tracking error is noted after attempting to align the receiver as described in the preceding section.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
20	150Ω & 120Ω carbon res.	High side to "A" terminal at rear of chassis in series with 120Ω. Low side to other "A" terminal in series with 150Ω.	88MC (Modulated ± 300KC	FM (clock-wise)	88MC	High side vertical amp. in series with .1 MFD. to Point A. Low side to chassis.	A18,A19 A20	Adjust A18 for symmetrical pattern. Adjust A19 and A20 for maximum amplitude of pattern.
21	"	"	98MC (Modulated ± 300KC)	"	98MC	"	A21	Adjust for symmetrical pattern.
22	"	"	108MC (Modulated ± 300KC)	"	108MC	"	A22	Adjust position of heavy braided lead connection to osc. coil for symmetrical pattern. Coat lead with speaker cement. Repeat A22 for maximum amplitude. Repeat Steps 20, 21 and 22 until satisfactory calibration and tracking at 88, 98 and 108MC is obtained. Apply speaker cement to top of each FM tuning slug.



SLUG TUNER ASSEMBLY



TRIMMER LOCATION CHART

CIRCLED NUMBERS CORRESPOND TO "A" ADJUSTMENT NUMBERS IN THE ALIGNMENT PROCEDURE.

SEE NEXT PAGE FOR ALTERNATE FM ALIGNMENT INSTRUCTIONS

ALTERNATE FM ALIGNMENT INSTRUCTIONS

FM ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Before performing Step 14 connect two 68KΩ resistors (within 1% of each other) in series from pin #7 of the 6AL5 tube to chassis. The common VTVM lead is connected to the junction of these resistors, which is Point (D).

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
13	.01 MFD.	High side to Pin #1 of 6BA6 2nd IF Tube #4. Low side to chassis near same tube.	10.7MC (400~ mod.)	FM (clockwise)	Any position where interfering signal is not received.	DC probe to Point (B). Common lead to chassis.	A12	Set VTVM to a low DC range. Adjust A12 for maximum reading (negative).
14	.01 MFD.	"	"	"	"	DC probe to Point (C). Common to Point (D).	A13	Set meter for lowest DC range. As A13 is rotated a point will be found where VTVM will swing sharply from a positive to a negative reading. Adjust A13 for zero voltage as A13 is moved through this point. Exercise extreme care in this adjustment. Remove the two 68KΩ resistors.
15	.01 MFD.	High side to Pin #1 of 6BA6 1st IF Tube #3. Low side to chassis near same tube.	"	"	"	DC probe to Point (B). Common to chassis.	A14,A15	Adjust for maximum meter reading.
16	.01 MFD.	High side to junction of A19 and FM RF Coil. Low side to chassis near tuner unit.	"	"	"	"	A16,A17	"

If position of FM tuner slugs have been disturbed or if coil or slug has been replaced omit Steps 17-19 inclusive and proceed with Step 20. If not, proceed with Step 17.

17	120Ω & 150Ω carbon res.	High side to "A" terminal at rear of chassis in series with 120Ω. Low side to other other "A" terminal in series with 150Ω.	98MC (400~ mod.)	FM (clockwise)	98MC	DC probe to Point (B). Common to chassis.	A18	Adjust to receive 98MC signal and adjust for maximum reading.
18	"	"	"	"	"	"	A19	Adjust for maximum reading. Recheck A16 & A17 for maximum reading.
19	"	"	90MC (400~ mod.)	"	Tune for maximum reading.	"	A20	Adjust for maximum reading. Check calibration at 88MC and 108MC. If within .4MC alignment is satisfactory. If greater than .4MC perform Steps 20, 21 and 22.

FM SLUG TUNER ADJUSTMENT

This procedure is to be used only where the positions of slugs in the slug tuner have been disturbed or in event of a coil or slug replacement, or where a serious calibration or tracking error is noted after attempting to align the receiver as described in the preceding section.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
20	120Ω & 150Ω carbon res.	High side to "A" terminal at rear of chassis in series with 120Ω. Low side to other "A" terminal in series with 150Ω.	88MC (400~ mod.)	FM (clockwise)	88MC	DC probe to Point (B). Common to chassis.	A18,A19 A20	Adjust A18 to receive 88MC signal. Adjust A19 & A20 for maximum reading.
21	"	"	98MC (400~ mod.)	"	98MC	"	A21	Adjust to receive 98MC signal and adjust for maximum reading.
22	"	"	108MC (400~ mod.)	"	108MC	"	A22	Adjust position of heavy braided lead connection to osc. coil for maximum reading. Coat lead with speaker cement. Adjust A22 for maximum reading. Repeat Steps 20, 21 and 22 until satisfactory calibration and tracking at 88, 98 and 108MC is obtained. Apply speaker cement to top of each FM tuning slug.

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	-.3VDC	0V.	0V.	6.5VAC	245VDC	122VDC	.8VDC	-
2	6SB7Y	0V.	0V.	320VDC	110VDC	-6VDC§	0V.	6.4VAC	-.35VDC
3	6BA6	-.7VDC	0V.	0V.	6.5VAC	299VDC	107VDC	0V.	-
‡ 4	6BA6	-.3VDC	0V.	0V.	6.5VAC	299VDC	111VDC	1VDC	-
‡ 5	6AL5	-.2VDC	-.2VDC	0V.	6.5VAC	0V.	0V.	-.4VDC	-
6	6SQ7	0V.	-.6VDC	0V.	-.6VDC	-.6VDC	95VDC	6.5VAC	0V.
7	6SJ7	0V.	0V.	.4VDC	-.1VDC	.4VDC	27VDC	6.5VAC	140VDC
8	6V6GT	0V.	0V.	300VDC	320VDC	-10VDC	0V.	6.5VAC	0V.
9	5Y3GT	0V.	405VDC	280VDC	330VAC	300VDC	330VAC	0V.	405VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS

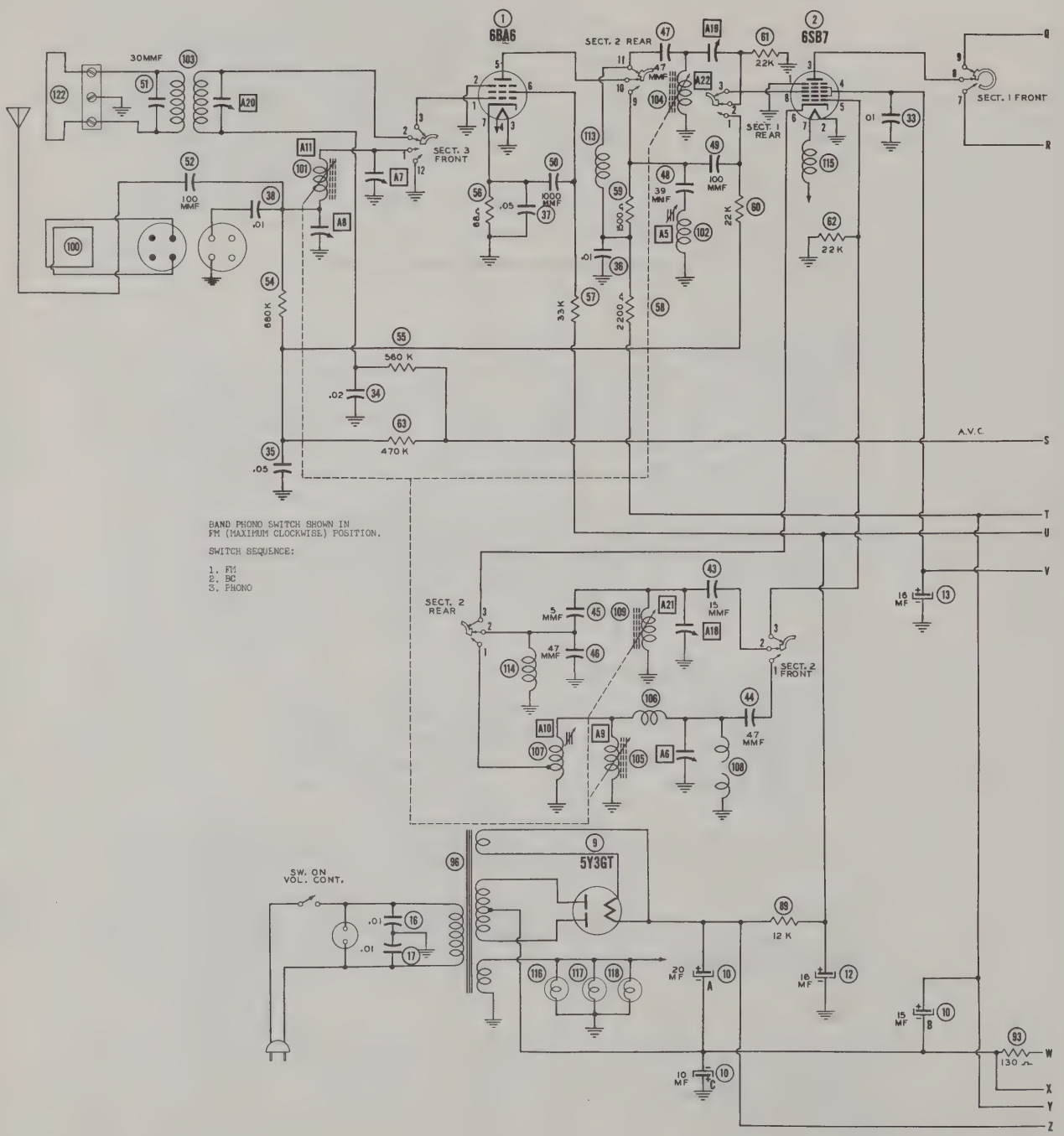
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	2 Meg.	0Ω	0Ω	.1Ω	200KΩ	235KΩ	68Ω	-
2	6SB7Y	0Ω	0Ω	200KΩ	200KΩ	22KΩ	.5Ω	.2Ω	1.5 Meg.
3	6BA6	1 Meg.	0Ω	0Ω	.1Ω	200KΩ	235KΩ	0Ω	-
‡ 4	6BA6	2.5 Meg.	0Ω	0Ω	.1Ω	200KΩ	235KΩ	68Ω	-
‡ 5	6AL5	INF.	INF.	0Ω	.1Ω	0Ω	0Ω	22KΩ	-
6	6SQ7	0Ω	10 Meg.	0Ω	500KΩ	500KΩ	630KΩ	.1Ω	0Ω
7	6SJ7	0Ω	0Ω	1KΩ	4.7 Meg.	1KΩ	2.1 Meg.	.1Ω	420KΩ
8	6V6GT	0Ω	0Ω	200KΩ	200KΩ	470KΩ	5 Meg.	.1Ω	0Ω
9	5Y3GT	INF.	200KΩ	200KΩ	200Ω	200KΩ	195Ω	INF.	200kΩ
10									

TONE CONTROL IN EXTREME CLOCKWISE POSITION.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

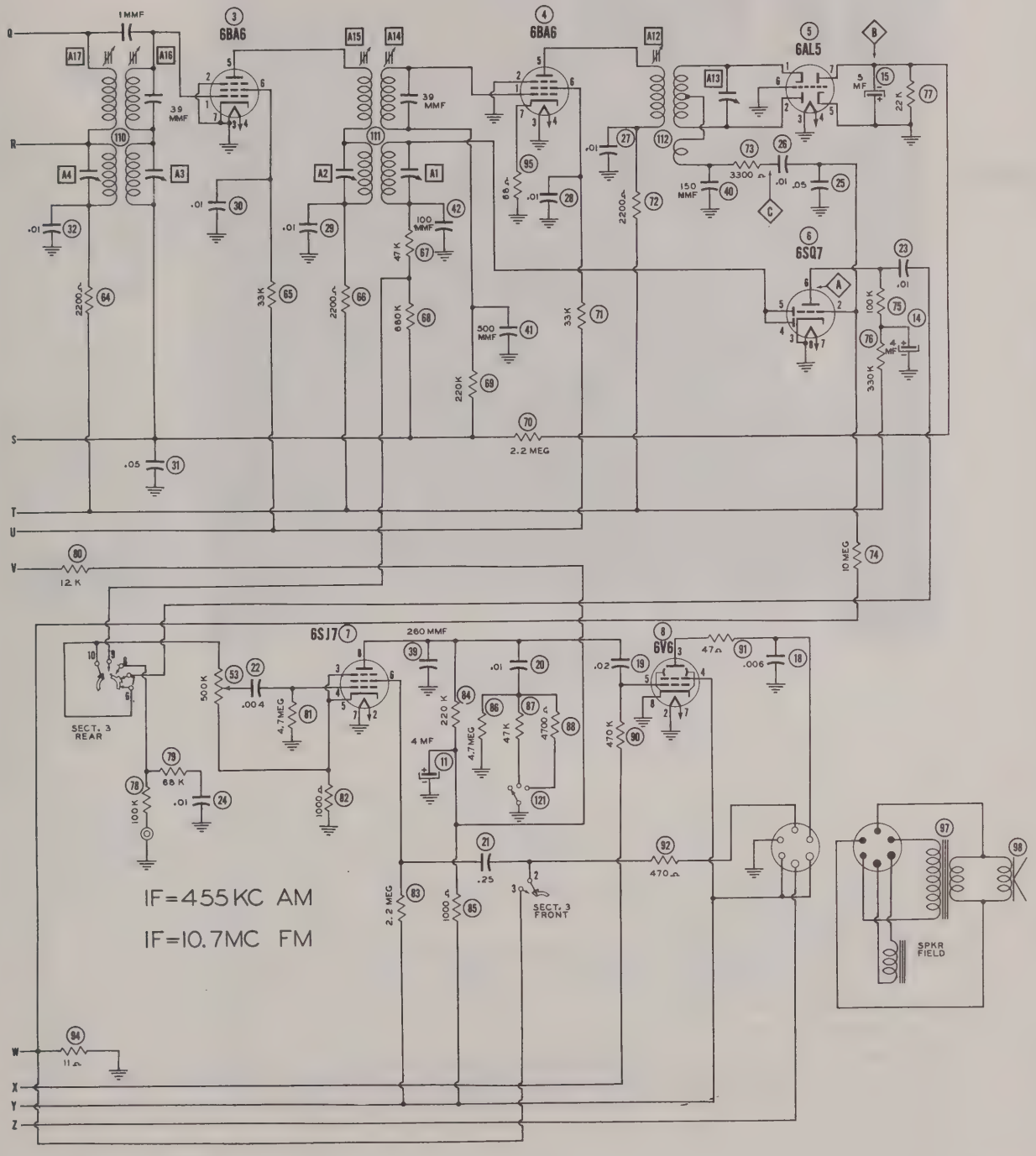
STAGE GAIN MEASUREMENTS			
ANTENNA TO RF GRID	3X		600KC
RF GRID TO CONVERTER GRID	4X		600KC
CONVERTER TO 1st IF GRID	9X	IN	600KC
		OUT	455kC
IF GRID TO DIODE	100X		455KC
1st AUDIO	30X		400∿
2nd AUDIO	20X		400∿
OUTPUT	15X		400∿

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurements operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.



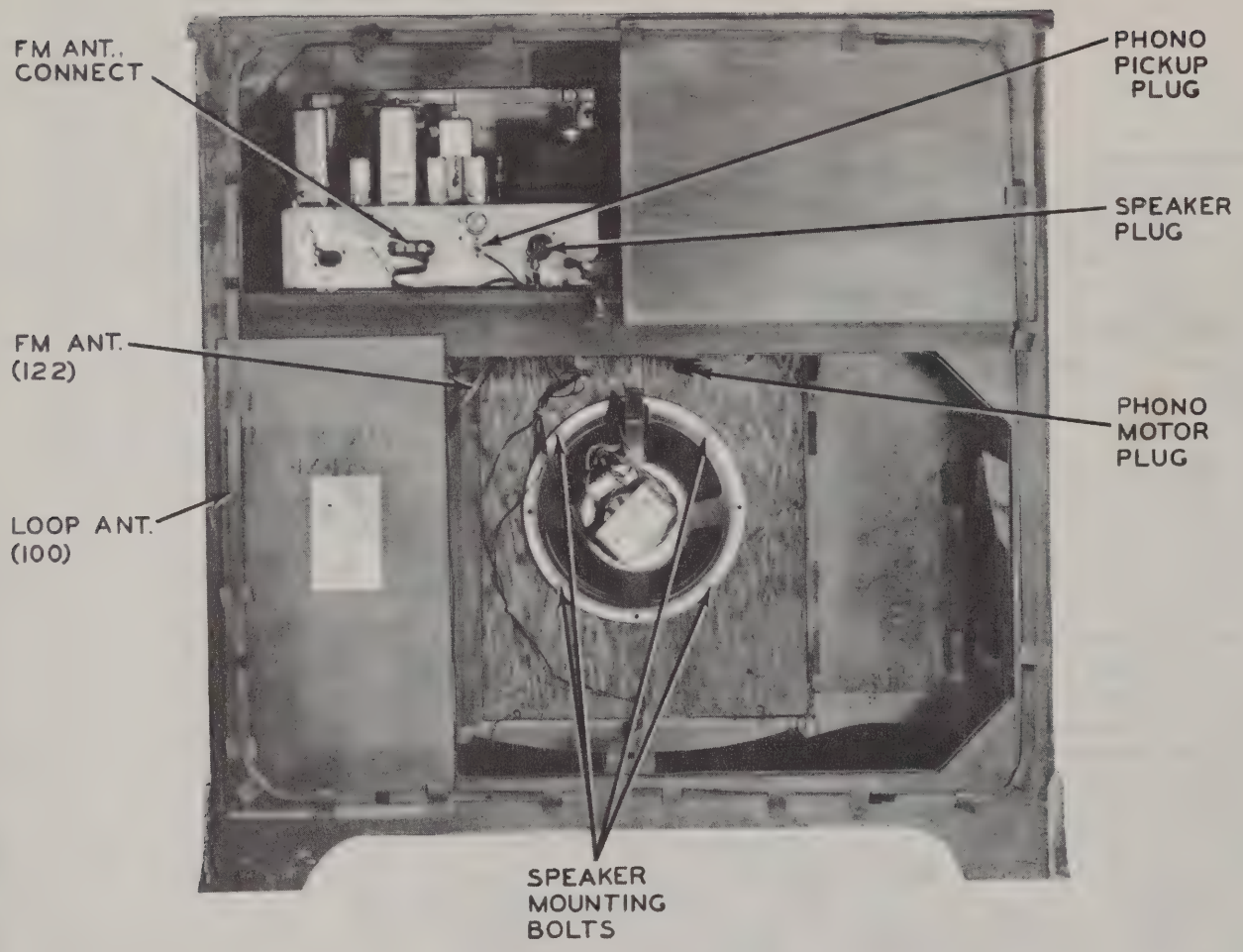
A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1948



A PHOTOFACT STANDARD NOTATION SCHEMATIC

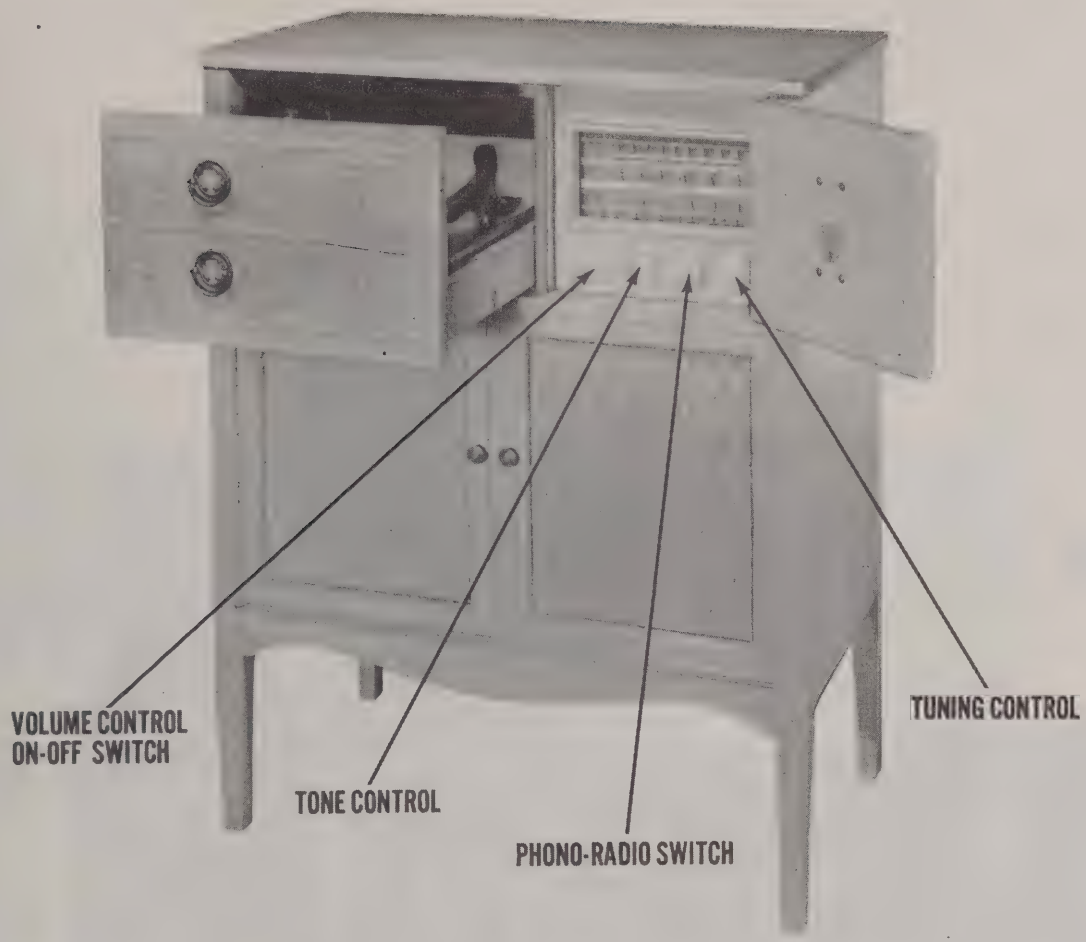
© Howard W. Sams & Co., Inc. 1948



DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Disconnect loop antenna leads.
3. Remove FM dipole leads from terminal strip on rear of chassis.
4. Remove phono-pickup plug from chassis.
5. Disconnect phono-motor plug.
6. Remove pilot light from front of cabinet.
7. Remove four hex head screws holding chassis in cabinet.
8. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.

GAROD MODEL
11FMP



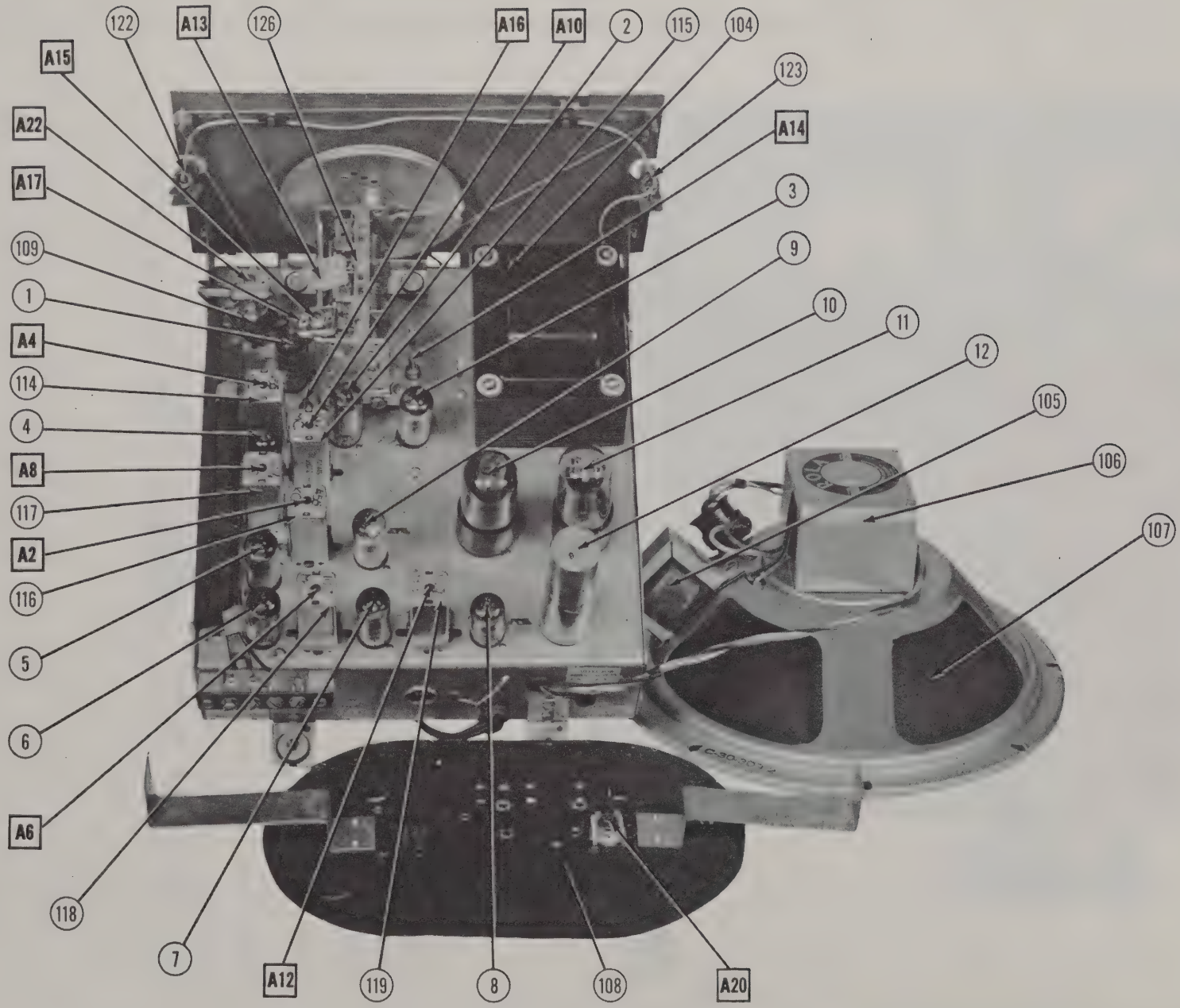
GAROD MODEL
11FMP

GAROD MODEL 11FMP

TRADE NAME	Garod, Model 11FMP
MANUFACTURER	Garod Radio Corp., Brooklyn 1, New York
TYPE SET	AC Operated Combination Phono-Radio 2 Band AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (ELEVEN)	Types, 6BA6 RF Amp., 6BE6 AM Conv.-FM Mixer, 6C4 FM Osc., 6BA6 1st IF Amp., 6AU6 2nd FM IF Amp., 6AU6 3rd FM IF Amp., 6AU6 Limiter, 6AL5 FM Disc., 6AT6 AM Det.-AVC-AF, 6K6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	.83 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1650KC
SHORT WAVE	5.3-18.5MC
FREQ. MOD.	87.5-108.5MC

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America


122
A13
126
A16
A10
2
115
104
A15
123
A22
A14
A17
3
109
9
1
10
11
A4
12
114
105
4
106
A8
107
117
A2
116
5
6
A6
118
7
A12
119
8
108
A20

A11
C
E
B
D
A
A5
A18
A21
A19
A1
A7
A9
A3

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: GAROD PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	AM Conv.-FM Mixer	6BE6	6BE6	7CH	
3	FM Oscillator	6C4	6C4	6BG	
4	1st IF Amp.	6BA6	6BA6	7BK	
5	2nd FM IF Amp.	6AU6	6AU6	7BK	
6	3rd FM IF Amp.	6AU6	6AU6	7BK	
7	FM Limiter	6AU6	6AU6	7BK	
8	FM Discriminator	6AL5	6AL5	6BT	
9	AM Det.-AVC-AF	6AT6	6AT6	7BT	
10	Power Output	6K6GT	6K6GT	7S	
11	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: GAROD PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
12A	20	450	5.400-4	AF44J	UP2245	DY-2x20-450	EL-220	Filter
B	20	450						"
13	4	450	5.418	PRS150-4	BR445	M-4-450	UT-4	"
14	10	25	5.413	PRS25-10	BR102A	M-10-25	TA-10	Cathode Bypass
15	.05	400		484-05	DT4S5	ST-4-05	TC-15	Line Filter
16	.003	600		684-003	DT6D3	ST-6-003	TC-23	Output Plate Bypass
17	.02	400		484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
18	.005	600		684-005	DT6D5	ST-6-005	TC-25	Tone Compensation
19	.015	200		484-015	DT4S15	ST-4-02	TC-12	" "
20	.005	600		684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
21	.02	200		484-02	DT2S2	ST-4-02	TC-12	" "
22	.02	400		484-02	DT4S2	ST-4-02	TC-12	Limiter Plate Decoup.
23	.005	600		684-005	DT6D5	ST-6-005	TC-25	3rd IF Screen Bypass
24	.01	400		484-01	DT4S1	ST-4-01	TC-11	3rd IF Cathode Bypass
25	.01	400		484-01	DT4S1	ST-4-01	TC-11	Filament Bypass
26	.005	600		684-005	DT6D5	ST-6-005	TC-25	2nd IF Screen Bypass
27	.01	400		484-01	DT4S5	ST-4-01	TC-11	2nd IF Cathode Bypass
28	.005	600		684-005	DT6D5	ST-6-005	TC-25	1st IF Plate Decoup.
29	.005	600		684-005	DT6D5	ST-6-005	TC-25	1st IF Screen Bypass
30	.02	200		484-02	DT2S2	ST-4-02	TC-12	1st IF Cathode Bypass
31	.01	400		484-01	DT4S1	ST-4-01	TC-11	AVC Filter
32	.02	200		484-02	DT2S2	ST-4-02	TC-12	" "
33	.005	600		684-005	DT6D5	ST-6-005	TC-25	Conv. Screen Bypass
34	.005	600		684-005	DT6D5	ST-6-005	TC-25	RF Screen Bypass
35	.1	400		484-.1	DT4P1	ST-4-1	TC-1	RF Bypass Pwr. Supply
36	.01	400		484-01	DT4S1	ST-4-01	TC-11	AVC Filter
37	.02	200		484-02	DT2S2	ST-4-02	TC-12	" "
38	220			1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass-Cer.
39	1000			1467-001	1W5D1	MO.3-21	1FM-21	De-emphasis - "
40	100			1468-0001	5W5T1	MO.5-31	1FM-31	Diode Load Cap.- "
41	47			1468-00005	5W5Q5	MO.5-45	1FM-45	Limiter Screen Bypass-Cer.
42	47			1468-00005	5W5Q5	MO.5-45	1FM-45	IF Coupling "
43	6000			684-006	1D5D6	MW.5-26	1FM-26	3rd IF Plate Decoup.
44	47			1468-00005	5W5Q5	MO.5-45	1FM-45	IF Coupling "
45	100			1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter "
46	100			1468-0001	5W5T1	MO.5-31	1FM-31	" " " "
47	6000			684-006	1D5D6	MW.5-26	1FM-26	Conv. Plate Decoup.
48	47			1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap. "
49	100			1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling "
50	1000			1467-001	1W5D1	MW.5-21	1FM-21	RF Plate Decoupling "
51	100			1468-0001	5W5T1	MO.5-31	1FM-31	Fixed Pad. "
52	3.3							Osc. Feedback "
53	1.1							Osc. Coupling "
54	47							Fixed Padder "
55	1500			1467-0015	1W5D15	MW.5-215	1FM-215	RF Bypass "
56	560			1468-0005	1W5T6	MO.5-36	1FM-35	" " "
57	47			1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap. "
58	385							Fixed Padder
59	220			1468-00025	5W5T25	MO.5-325	1FM-325	AVC Filter "

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: GAROD PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
105	9000Ω	3.7Ω	300Ω	.75Ω	Part of 30.309	A-3823	T22S87	A-2936	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: GAROD PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD RES.	VC IMP.				
106	600Ω	3.2Ω	30.309		10E60†	†Replace output transformer to match 6-8Ω voice coil.
	CONE DIA.	VC DIA.				
107	9½"	1"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: GAROD PART No.	REPLACEMENT DATA: MEISSNER PART No.	
108	Loop Ant.	.1Ω	1Ω	1.463		
109	SW Ant.Coil	1.3Ω	0Ω	1.455		
110	FM " "	0Ω	0Ω	1.451		
111	FM RF Coil		0Ω	1.452		
112A	BC Osc.Coil		8Ω	1.456		
B	SW " "		.1Ω			
113	FM " "		0Ω	1.453		
114	AM 1st IF	14Ω	14Ω	1.445		
115	FM " "	.5Ω	.5Ω	1.446		
116	AM 2nd IF	14Ω	14Ω	1.445		
117	FM " "	.5Ω	.5Ω	1.446		
118	FM 3rd IF	.5Ω	.5Ω	1.445		
119	Disc. Trans.	.5Ω	1Ω	1.454		
120	RF Choke		1Ω	1.457		
121	" "		1Ω	1.457		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: GAROD PART No.	REPLACEMENT DATA	INSTALLATION NOTES
122	Bayonet	6-8	0.25	Blue			Type 44
123	"	6-8	0.25	"			" "

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA: GAROD PART No.	REPLACEMENT DATA: ASTATIC PART No.	REMARKS
124		QT3-M or Nylon-1-M	MLP-1 is original part.

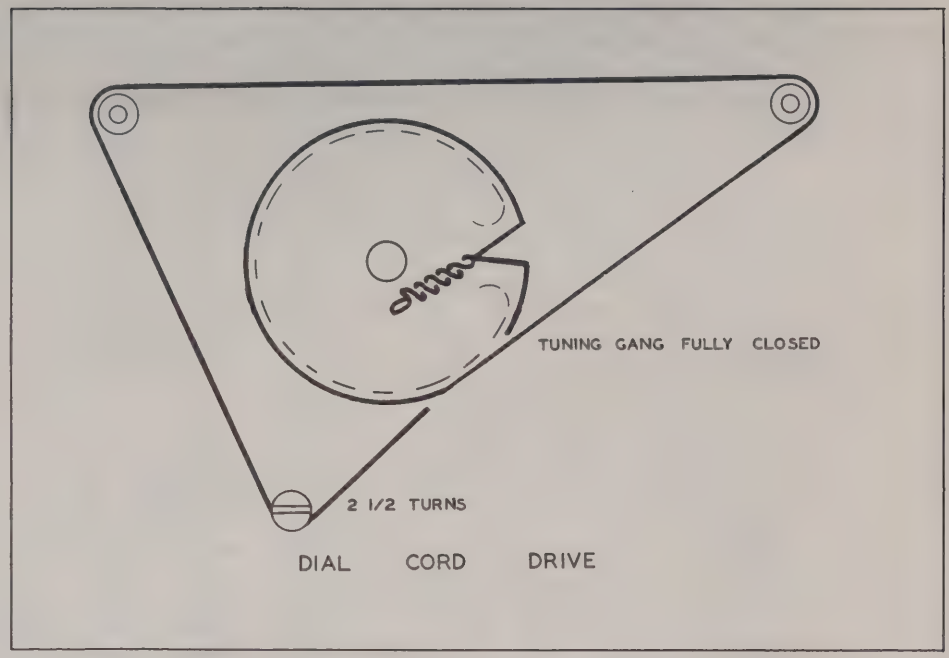
MISCELLANEOUS

ITEM No.	PART NAME	GAROD PART No.	NOTES
125	Switch	11.213	
126	2 Gang Var. Cap.	2.209	(16-517MMF) each section
A18	Trimmer Strip	4.101	BC Osc. Adj.
A19			BC Osc. Pad.
A21			SW Osc. Adj.

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	GAROD PART No.	IRC PART No.	CLAROSTAT PART No.	
60A	1 Meg.	½	8.202-1	D15-137X	AT-112	Volume Control tapped @ 400KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 60A per instructions
C	Switch		" "	41	SW-A	" " " " "
61A	1 Meg.	½	8.200-5	D11-137	AM-61-S	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 61A per instructions



RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	GAROD PART No.	IRC PART No.	
62	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
63	33KΩ	1		BTA-33K	Or.-Or.-Or. RF Screen Dropping
64	2200Ω	½		BTS-2200	Red-Red-Red RF Plate Decoupling
65	6800Ω	1		BTA-6800	Blue-Gray-Red RF Plate Load
66	22KΩ	½		BTS-22K	Red-Red-Or. Injection Grid
67	22KΩ	½		BTS-22K	Red-Red-Or. Converter Grid
68	20KΩ	2		BT-2-22K	Red-Blk.-Or. Converter Screen Dropping
69	2200Ω	½		BTS-2200	Red-Red-Red Converter Plate Decoupling
70	47Ω	½		BW-½-47	Yl.-Vi.-Blk. Parasitic Suppressor
71	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
72	22KΩ	1		BTA-22K	Red-Red-Or. Oscillator Plate Decoupling
73	68Ω	½		BW-½-68	Blue-Gray-Blk. 1st IF Cathode
74	33KΩ	1		BTA-33K	Or.-Or.-Or. 1st IF Screen Dropping
75	2200Ω	½		BTS-2200	Red-Red-Red 1st IF Plate Decoupling
76	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Diode RF Filter
77	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Diode Load
78	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
79	68Ω	½		BW-½-68	Blue-Gray-Blk. 2nd IF Cathode
80	33KΩ	1		BTA-33K	Or.-Or.-Or. 2nd IF Screen Dropping
81	4700Ω	1		BTA-4700	Yl.-Vi.-Red 2nd IF Plate Load
82	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 3rd IF Grid
83	100Ω	½		BW-½-100	Br.-Blk.-br. 3rd IF Cathode
84	47KΩ	1		BTA-47K	Yl.-Vi.-Or. 3rd IF Screen Dropping
85	2200Ω	½		BTS-2200	Red-Red-Red 3rd IF Plate Decoupling
86	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Limiter Grid
87	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. " "
88	47KΩ	½		BTS-47K	Yl.-Vi.-Or. " "
89	220KΩ	½		BTS-220K	Red-Red-Yl. Limiter Screen Dropping
90	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Limiter Plate Decoupling
91	220KΩ	½		BTS-220K	Red-Red-Yl. Bleeder
92	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Discriminator Diode Load
93	100KΩ	½		BTS-100K	Br.-Blk.-Yl. " " "
94	47KΩ	½		BTS-47K	Yl.-Vi.-Or. De-emphasis
95	220KΩ	½		BTS-220K	Red-Red-Yl. Series Phono
96	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Phono Shunt
97	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
98	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate Load
99	15KΩ	½		BTS-15K	Br.-Grn.-Or. Tone Compensation
100	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
101	560Ω	1		BTA-560	Grn.-Blue-Br. Output Cathode
102	270Ω	½		BW-½-270	Red-Vi.-Br. 1st IF Cathode
103	270Ω	½		BW-½-270	Red-Vi.-Br. 1st IF Cathode

DISASSEMBLY INSTRUCTIONS

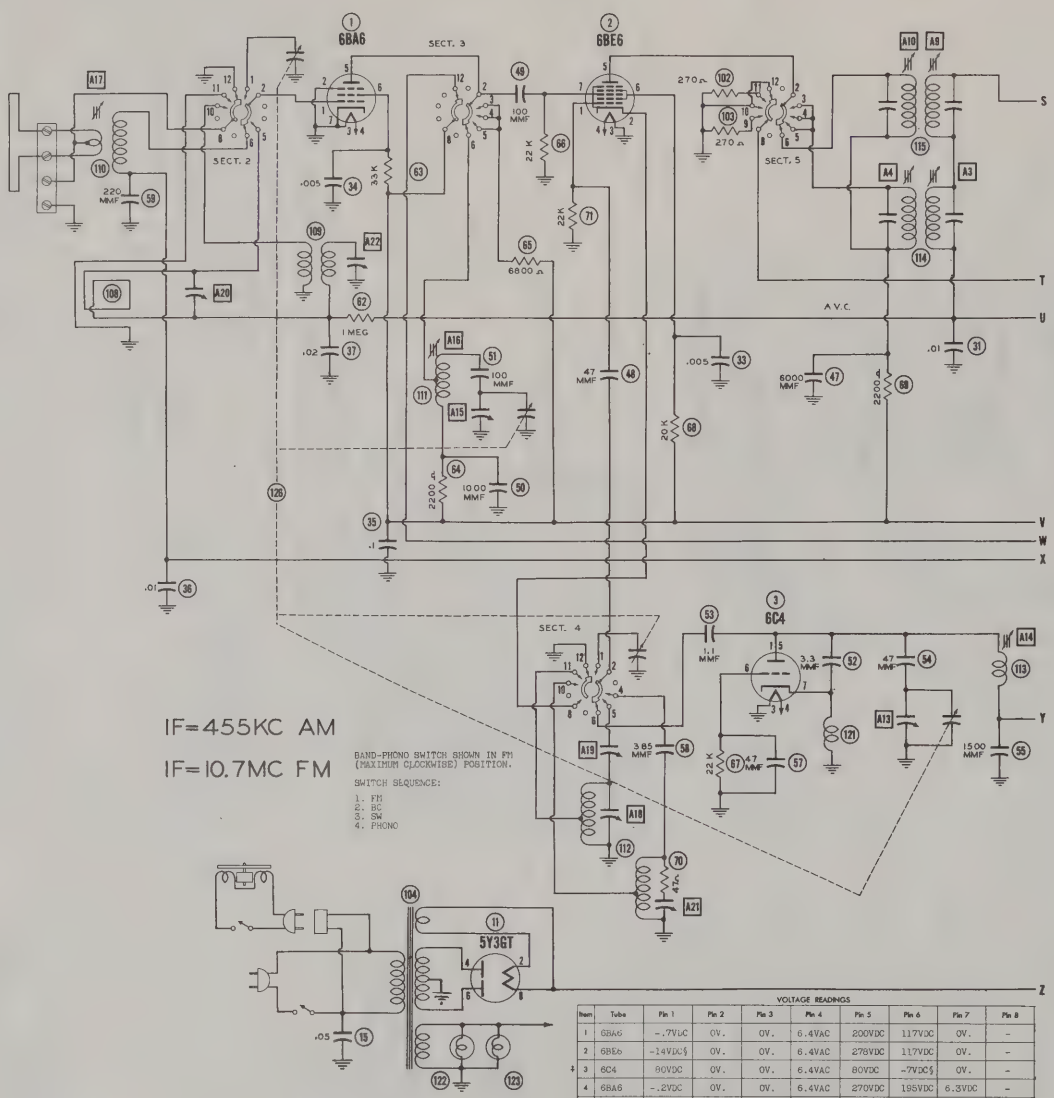
1. Remove four push-on type control knobs.
2. Remove FM dipole from terminal strip on back of chassis.
3. Remove phono-motor plug from chassis.
4. Remove phono-pickup plug from chassis.
5. Remove speaker plug from speaker.
6. Remove loop leads from loop antenna.
7. Remove two wood screws holding loop antenna in cabinet. Remove loop from cabinet.
8. Remove four screws holding chassis in cabinet. Remove chassis from cabinet.
9. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	GAROD PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
104	117V AC @ .8A	700V CT @ .11A	5.0V AC @ 2.0A	6.4V AC @ 3.0A	9.206	P-6013	T22R08	P-7853

DATE 4/46-#488-7

SET #30-FOLDER #7



RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

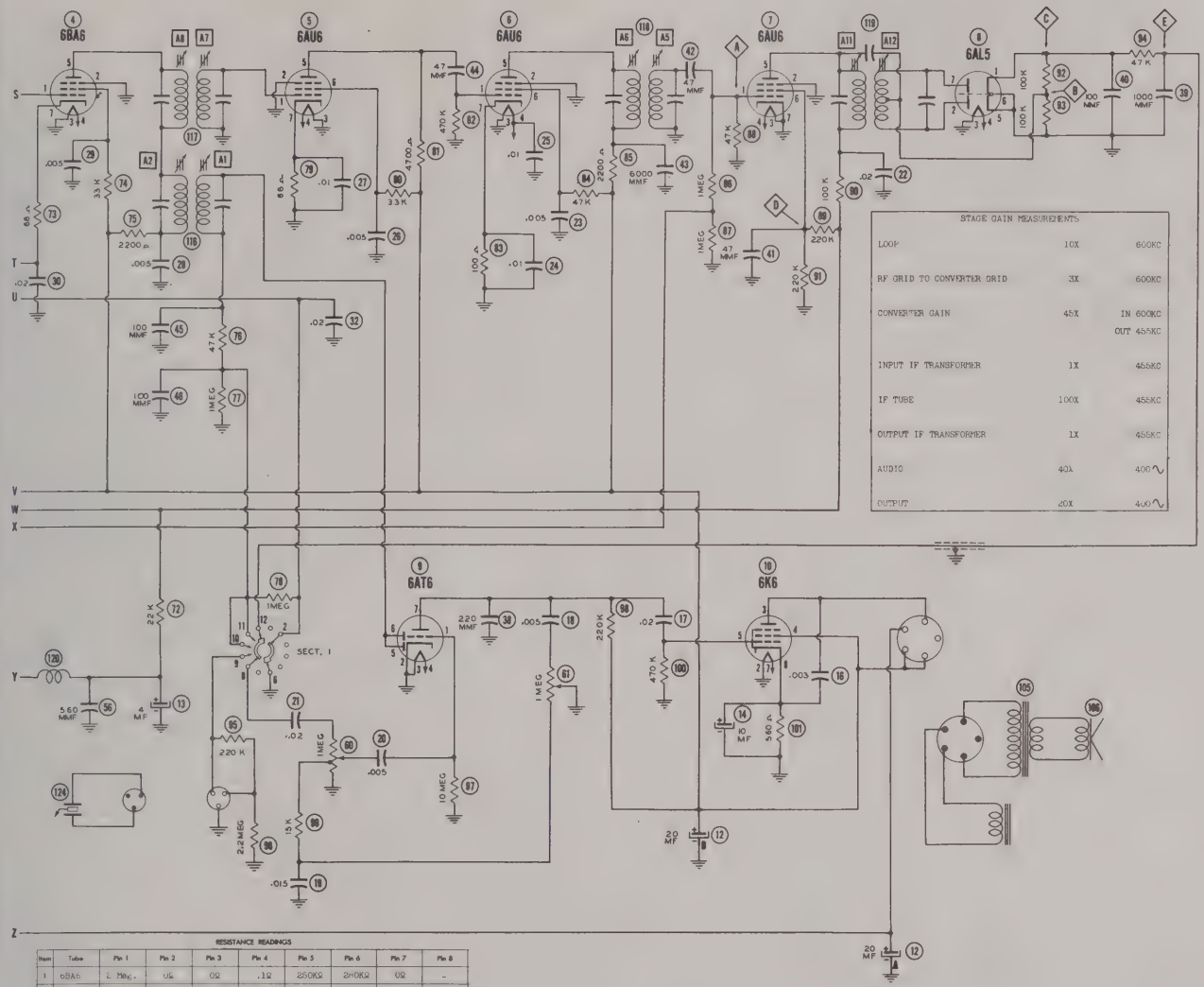
VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	-.7VDC	0V.	0V.	6.4VAC	200VDC	117VDC	0V.	-
2	6BE6	-14VDC§	0V.	0V.	6.4VAC	278VDC	117VDC	0V.	-
‡ 3	6C4	80VDC	0V.	0V.	6.4VAC	80VDC	-7VDC§	0V.	-
4	6BA6	-.2VDC	0V.	0V.	6.4VAC	270VDC	195VDC	6.3VDC	-
‡ 5	6AU6	0V.	0V.	0V.	6.4VAC	225VDC	140VDC	.8VDC	-
‡ 6	6AU6	0V.	0V.	0V.	6.4VAC	250VDC	155VDC	1.2VDC	-
‡ 7	6AU6	-.4VDC	0V.	0V.	6.4VAC	10VDC	60VDC	0V.	-
‡ 8	6AL5	.2VDC	-.4VDC	0V.	6.4VAC	0V.	0V.	-.4VDC	-
9	6AT6	0V.	0V.	0V.	6.4VAC	-.4VDC	-.4VDC	90VDC	-
10	6K6GT	0V.	0V.	278VDC	250VDC	0V.	0V.	6.4VAC	18VDC
11	5Y3GT	0V.	360VDC	0V.	350VAC	0V.	350VAC	0V.	360VDC

STAKEN WITH VACUUM TUBE VOLTMETER.
VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1948

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	2 Meg.	0Ω	0Ω	.1Ω	250KΩ	280KΩ	0Ω	-
2	6BE6	22KΩ	1Ω	0Ω	.1Ω	250KΩ	270KΩ	22KΩ	-
* 3	6C4	270KΩ	270KΩ	0Ω	.1Ω	270KΩ	22KΩ	1Ω	-
4	6BA6	1 Meg.	0Ω	0Ω	.1Ω	250KΩ	280KΩ	600Ω	-
* 5	6AU6	.5Ω	0Ω	0Ω	.1Ω	250KΩ	280KΩ	68Ω	-
* 6	6AU6	470KΩ	0Ω	0Ω	.1Ω	250KΩ	300KΩ	100Ω	-
* 7	6AU6	47KΩ	0Ω	0Ω	.1Ω	350KΩ	200KΩ	0Ω	-
* 8	6AL5	200KΩ	100KΩ	0Ω	.1Ω	0Ω	0Ω	100KΩ	-
9	6AT6	10 Meg.	0Ω	0Ω	.1Ω	1 Meg.	1 Meg.	470KΩ	
10	6K6GT	0Ω	0Ω	250KΩ	250KΩ	470KΩ	600KΩ	.1Ω	560KΩ
11	5Y3GT	INF.	250KΩ	INF.	75Ω	0Ω	70Ω	INF.	250KΩ

* VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1948

488-7

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use insulated alignment screwdriver for all adjustments.

AM IF ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	455KC	BC (1 position clockwise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
2	.01 MFD.	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	10.7MC (unmodulated)	FM (fully counter-clockwise)	Tuning cap. fully open.	DC probe to Point (B). Common to chassis.	A5,A6, A7,A8, A9,A10	Adjust for maximum deflection in order given and repeat.
3	.01 MFD.	"	"	"	"	DC probe to Point (B). Common to chassis.	A11	Adjust for maximum deflection.
4	.01 MFD	"	"	"	"	DC probe to Point (C). Common to chassis.	A12	Adjust for zero deflection between positive and negative readings. Continue with FM-RF alignment, Step 6.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60~ modulation, 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
2	.01 MFD	High side to Pin 1 (grid) of 6AU6 2nd IF Amp. (5). Low side to chassis.	10.7MC (freq. mod.)	FM (fully counter-clockwise)	Tuning cap. fully open.	Vertical amplifier to Point (D) in series with .1 MFD. cap. Ground to chassis.	A5,A6	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
3	.01 MFD	High side to Pin 1 (grid) of 6BA6. 1st IF Amp. (4). Low side to chassis.	"	"	"	Vertical amplifier to Point (A) in series with 250KΩ res. Grnd. to chassis.	A7,A8	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 2.
4	.01 MFD	High side to side to Pin 7 (grid) of 6BE6. Low side to chassis.	"	"	"	"	A9,A10	"
5	.01 MFD	High side to Pin 1 (grid) of 6AU6. 2nd IF Amp. (5). Low side to chassis.	"	"	"	Vertical amplifier to Point (B). Ground to chassis.	A11,A12	Alternately adjust A11 for maximum amplitude and A12 for maximum straightness of crossover lines with crossover occurring at center of pattern of Fig. 3. Continue with FM-RF Alignment Step 6.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6	2 150Ω carbon res.	Each side in series with 150Ω to FM dipole terminals.	108.5MC (unmodulated)	FM	Tuning cap. fully open.	DC probe to Point (A). Common to chassis	A13	Adjust for maximum deflection.
7	"	"	87.5MC	"	Tuning cap. fully closed	"	A14	Adjust for maximum deflection. Repeat Steps 6 & 7 until no further improvement can be made.
8	"	"	105MC	"	Tune for maximum deflection.	"	A15	Rock tuning cap. and adjust for maximum deflection.
9	"	"	90MC	"	"	"	A16	Rock tuning cap. and adjust for maximum deflection. Repeat Steps 8 & 9 until no further improvement can be made.
10	"	"	95MC	"	"	"	A17	Adjust for maximum deflection.

AM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
11		Loop	1650KC	AM	Tuning cap. fully open.	Across voice coil	A18	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
12		"	540KC	"	540KC	"	A19	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximent output. Repeat Step 11.
13		"	1500KC	"	1500KC	"	A20	Adjust for maximum output
14		"	600KC	"	600KC	"	A19	Rock tuning cap. and adjust for maximum output. Repeat Step 13.
15	400Ω carbon res.	High side to ant. terminal. Low side to ground.	18.5MC	SW (2 position clockwise)	18.5MC	"	A21	Open A21 to minimum capacity and tighten to first peak.
16	"	"	16.0MC	"	Tune for maximum output.	"	A22	Rock tuning cap. and adjust for maximum output.

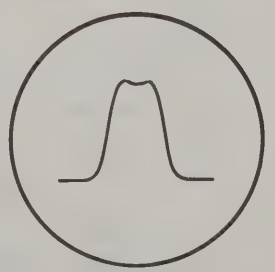


FIG. 1

FIG. 2

FIG. 3

KNIGHT MODEL 93-191

TRADE NAME	Knight, Model 93-191
SUPPLIER	Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.
TYPE SET	AC Operated 6 Channel Audio Amplifier
TUBES (THIRTEEN)	Types, 6SJ7 Mic. Amp., 6SJ7 Mic. 2 Amp., 6SJ7 Mic. 3 Amp., 6SJ7 Mic. 4 Amp., (2) 6SN7GT AF Amp., 6J5 AF Amp., 6F6 Driver, (2) 6L6 Power Output, 5U4G Rectifier, 83 Rectifier, 5U4G Rectifier.
POWER SUPPLY	110-125 Volts AC RATING 1.9 Amp. @ 117 Volts AC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0V.	3VAC	0V.	*	0V.	25VDC	3VAC	80VDC
2	6SJ7	0V.	3VAC	0V.	*	0V.	25VDC	3VAC	80VDC
3	6SJ7	0V.	3VAC	0V.	*	0V.	25VDC	3VAC	80VDC
4	6SJ7	0V.	3VAC	0V.	*	0V.	25VDC	3VAC	80VDC
5	6SN7	0V.	35VDC	1.1VDC	0V.	35VDC	1.1VDC	3VAC	3VAC
6	6SN7	0V.	35VDC	1.1VDC	0V.	35VDC	1.1VDC	3VAC	3VAC
7	6J5	0V.	3VAC	55VDC	0V.	0V.	55VDC	3VAC	2.5VDC
8	6F6	0V.	3VAC	315VDC	315VDC	0V.	0V.	3VAC	30VDC
9	6L6	0V.	3VAC	465VDC	315VDC	-31VDC	0V.	3VAC	0V.
10	6L6	0V.	3VAC	465VDC	315VDC	-31VDC	0V.	3VAC	0V.
11	5U4G	0V.	0V.	0V.	77VAC	0V.	77VAC	0V.	5VAC
12	83	470VDC	350VAC	350VAC	470VDC	-	-	-	-
13	5U4G	0V.	315VDC	0V.	230VAC	0V.	230VAC	0V.	315VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SJ7	0Ω	.1Ω	0Ω	*	0Ω	2.3 Meg.	.1Ω	570KΩ
2	6SJ7	0Ω	.1Ω	0Ω	*	0Ω	2.3 Meg.	.1Ω	570KΩ
3	6SJ7	0Ω	.1Ω	0Ω	*	0Ω	2.3 Meg.	.1Ω	570KΩ
4	6SJ7	0Ω	.1Ω	0Ω	*	0Ω	2.3 Meg.	.1Ω	570KΩ
5	6SN7	0Ω	270KΩ	615Ω	0Ω	270KΩ	615Ω	.1Ω	.1Ω
6	6SN7	0Ω	270KΩ	615Ω	0Ω	270KΩ	615Ω	.1Ω	.1Ω
7	6J5	0Ω	.1Ω	570KΩ	INF.	0Ω	570KΩ	.1Ω	5KΩ
8	6F6	0Ω	.1Ω	100KΩ	100KΩ	220KΩ	INF.	.1Ω	1.9KΩ
9	6L6	0Ω	.1Ω	100KΩ	85KΩ	200Ω	INF.	.1Ω	0Ω
10	6L6	0Ω	.1Ω	100KΩ	85KΩ	200Ω	INF.	.1Ω	0Ω
11	5U4G	INF.	0Ω	INF.	140Ω	INF.	140Ω	INF.	0Ω
12	83	100KΩ	28Ω	27Ω	100KΩ	-	-	-	-
13	5U4G	INF.	85KΩ	INF.	18Ω	INF.	19Ω	INF.	85KΩ

*DO NOT MEASURE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

KNIGHT MODEL 93-191
KNIGHT MODEL 93-191

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Mic. 1 Amp.	6SJ7	6SJ7	8N	
2	Mic. 2 Amp.	6SJ7	6SJ7	8N	
3	Mic. 3 Amp.	6SJ7	6SJ7	8N	
4	Mic. 4 Amp.	6SJ7	6SJ7	8N	
5	AF Amp.	6SN7GT	6SN7GT	8BD	
6	AF Amp.	6SN7GT	6SN7GT	8BD	
7	AF Amp.	6J5	6J5	6Q	
8	Driver	6F6	6F6	7S	
9	Power Output	6L6	6L6	7AC	
10	" "	6L6	6L6	7AC	
11	Bias Rectifier	5U4G	5U4G	5T	
12	Rectifier	83	83	4C	
13	"	5U4G	5U4G	5T	

CAPACITORS

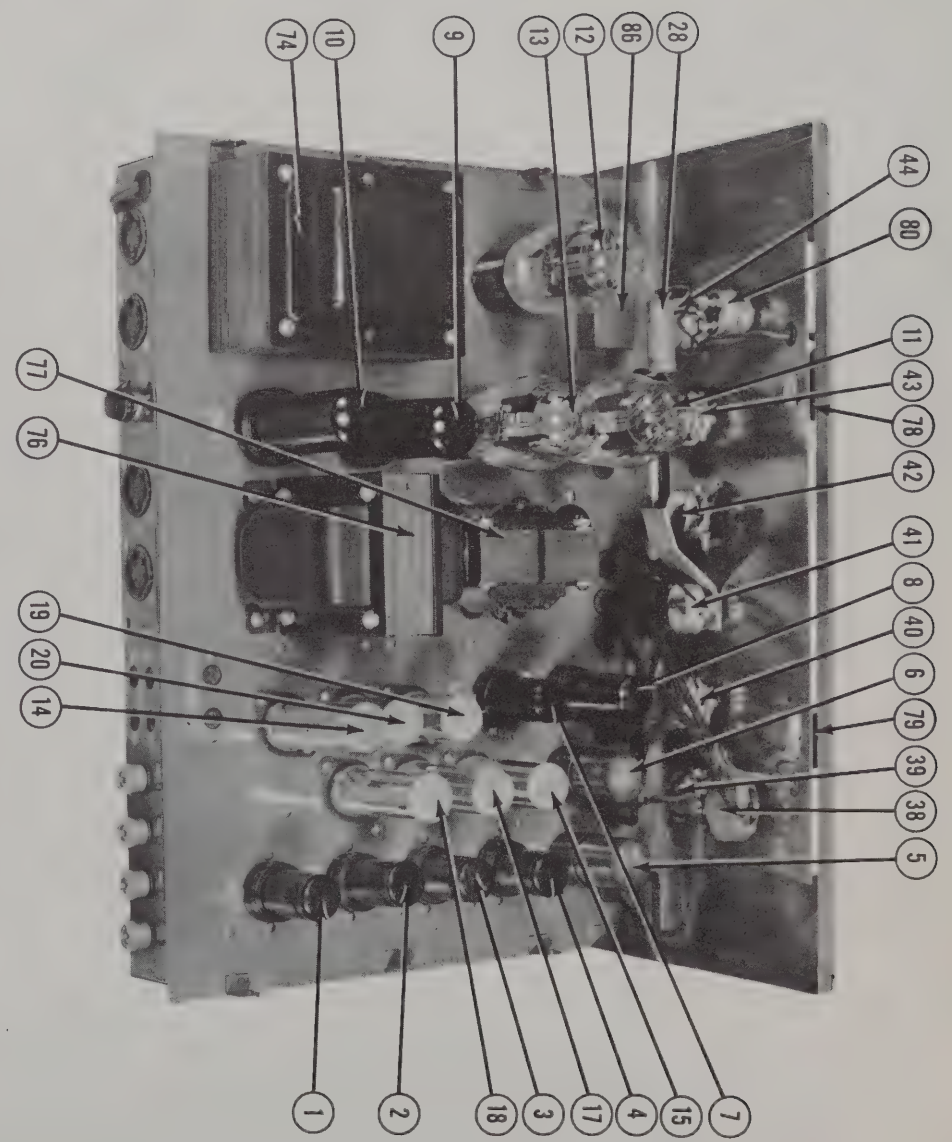
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: SPRAGUE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
14	30	500	CE-306B	EL-3		UP3050	DY-20-525	Filter
							LM-8-525	
15	30	500	CE-306B	EL-3		UP3050	"	"
16	16	450	CE-166D	UT-16	PRS450-16	BR1645	DH-16-450	"
17	30	450	CE-306A	EL-3	AF6J	UP3045	DY-30-450	"
18A	10	450	CE-306A	EL-310	AF222J	UP11145	DY-3x10-450	Decoupling Filters
B	10	450					"	"
C	10	450					"	"
19	250	50						Bias Filter
20	250	50						" "
21	40	25	CE-406C	TA-50	PRS25-50	BR502	M-50-25	Driver Cathode Bypass
22	40	25	CE-406C	TA-50	PRS25-50	BR502	M-50-25	AF Cathode Bypass
23	40	25	CE-406C	TA-50	PRS25-50	BR502	M-50-25	AF Cathode Bypass
24	.006	1600		TR-25	1684-006	MD16D6	TM-16-006	Output Plate Bypass
25	.001	600		TC-21	684-001	DT6D1	ST-6-001	Driver Plate Bypass
26	.05	400		TC-15	484-05	DT4S5	ST-4-05	Audio Coupling
27	.001	600		TC-21	684-001	DT6D1	ST-6-001	Tone Comp.
28	.05	400		TC-15	484-05	DT4S5	ST-4-05	" "
29	.1	600		TC-1	684-.1	DT6D1	ST-6-1	Audio Coupling
30	.05	400		TC-15	484-05	DT4S5	ST-4-05	Screen Bypass
31	.05	400		TC-15	484-05	DT4S5	ST-4-05	" "
32	.05	400		TC-15	484-05	DT4S5	ST-4-05	" "
33	.05	400		TC-15	484-05	DT4S5	ST-4-05	" "
34	5000	300		1FM-25	1467-005	1D5D5	MW.5-25	Audio Coupling
35	5000	300		1FM-25	1467-005	1D5D5	MW.5-25	" "
36	5000	300		1FM-25	1467-005	1D5D5	MW.5-25	" "
37	5000	300		1FM-25	1467-005	1D5D5	MW.5-25	" "

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: KNIGHT PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
38A	100KΩ	½		D13-128		Master Gain Control
B	Shaft			A		Attach to 38A per instructions
39A	500KΩ	½		D13-133	M-60-Z	Mike 1 Control
B	Shaft			A	Not Req.	Attach to 39A per instructions
40A	500KΩ	½		D13-133	M-60-Z	Mike 2 Control
B	Shaft			A	Not Req.	Attach to 40A per instructions
41A	1 Meg.	½		DVC-539X		Mike 3 & Phono 1 Fader Control tapped @ 500KΩ
B	Shaft			A		Attach to 41A per instructions
42A	1 Meg.	½		DVC-539X		Mike 4 & Phono 2 Fader Control tapped @ 500KΩ
B	Shaft			A		Attach to 42A per instructions
43A	2 Meg.	½		D13-139		Bass Control
B	Shaft			A		Attach to 43A per instructions
44A	500KΩ	½		D13-133	M-60-Z	Treble Control
B	Shaft			A	Not Req.	Attach to 44A per instructions

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	KNIGHT PART No.	IRC PART No.	
45	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 1st Mic. Amp. Grid
46	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 2nd Mic. Amp. Grid
47	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 3rd Mic. Amp. Grid
48	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 4th Mic. Amp. Grid
49	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 1st Mic. Amp. Screen Dropping
50	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 2nd Mic. Amp. Screen Dropping
51	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 3rd Mic. Amp. Screen Dropping
52	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. 4th Mic. Amp. Screen Dropping
53	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 1st Mic. Amp. Plate Load
54	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 2nd Mic. Amp. Plate Load
55	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 3rd Mic. Amp. Plate Load
56	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 4th Mic. Amp. Plate Load
57	22KΩ	½		BTS-22K	Red-Red-Or. Decoupling
58	22KΩ	½		BTS-22K	Red-Red-Or. Decoupling
59	22KΩ	½		BTS-22K	Red-Red-Or. 1st AF Plate Decoupling
60	680Ω	½		BTS-680	Blue-Gray-Br. 1st AF Cathode
61	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 1st AF Plate Load
62	50KΩ	½		BTS-47K	Grn.-Blk.-Or. Isolation
63	50KΩ	½		BTS-47K	Grn.-Blk.-Or. "
64	50KΩ	½		BTS-47K	Grn.-Blk.-Or. "
65	50KΩ	½		BTS-47K	Grn.-Blk.-Or. "
66	4700Ω	½		BTS-4700	Yl.-Vi.-Red 2nd AF Cathode
67	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 2nd AF Plate Load
68A	10Ω	½		BW-1-10	Feedback
B	240Ω	½		BW-1-220	"
69	220Ω	½		BW-½-220	Red-Red-Br. "
70	220KΩ	½		BTS-220K	Red-Red-Yl. Driver Grid
71	2200Ω	½		BTS-2200	Red-Red-Red Driver Cathode
72	7500Ω	10		AB-7500	Filter
73	125Ω	20		DHA-150	Bias Network-See Note

Note-On IRC replacement set slider @ 125 from one end.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	KNIGHT PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
74	117V AC @ 1.9A	170V CT @ .250A	6.3V CT @ 3.0A	5.0V AC @ 3.0A	LP-0069A			
		SEC. 4	SEC. 5	SEC. 6				
		5.0V AC @ 3.0A	5.0V AC @ 3.0A	700V CT tapped @460V CT @ .127a				

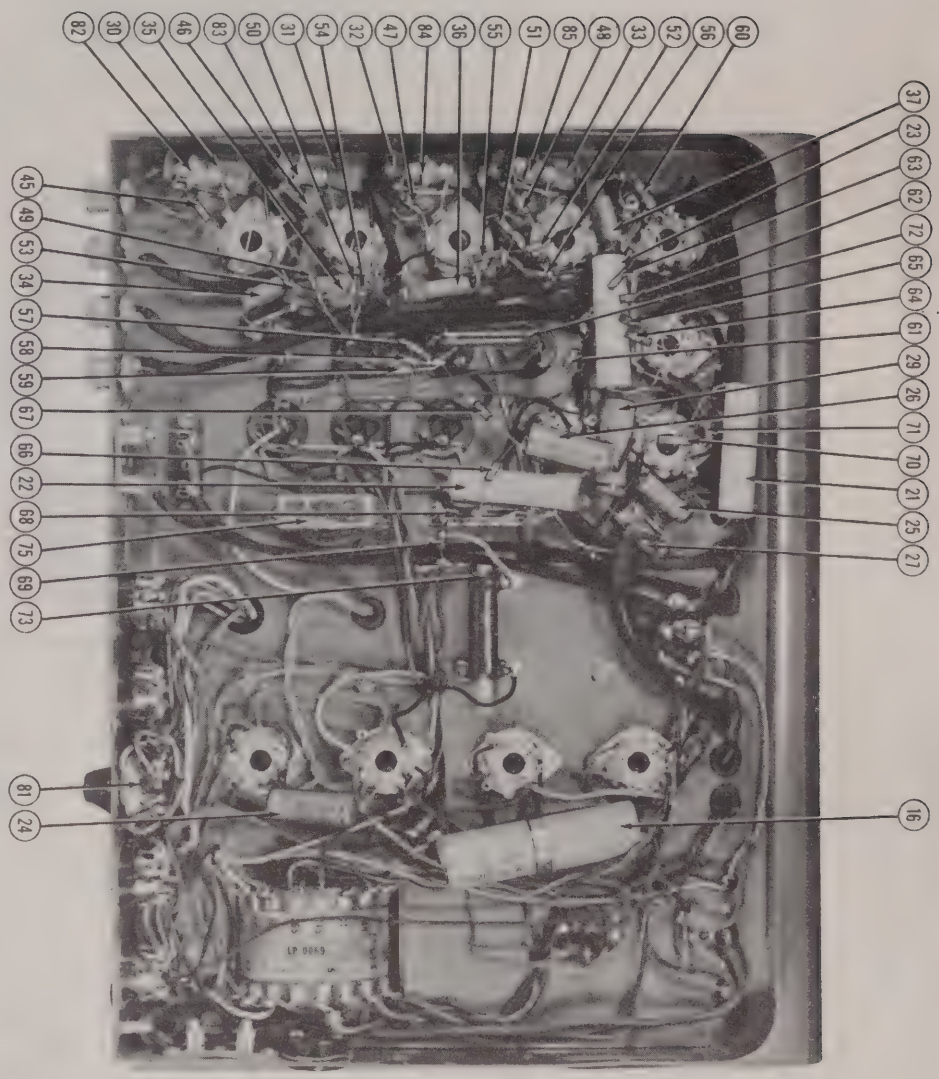
FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ℓ)	KNIGHT PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	
75	.250 A	6Ω	.lo Henries	LC-0027A				

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		KNIGHT PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
76	2500Ω CT	2Ω 4Ω 6Ω 8Ω 250Ω 500Ω	60Ω CT	.1Ω .15Ω .2Ω .25Ω 7Ω 11Ω	LO-0048A	A-3306*	T-22S72*	A-3129*	*Drill new mounting holes.

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

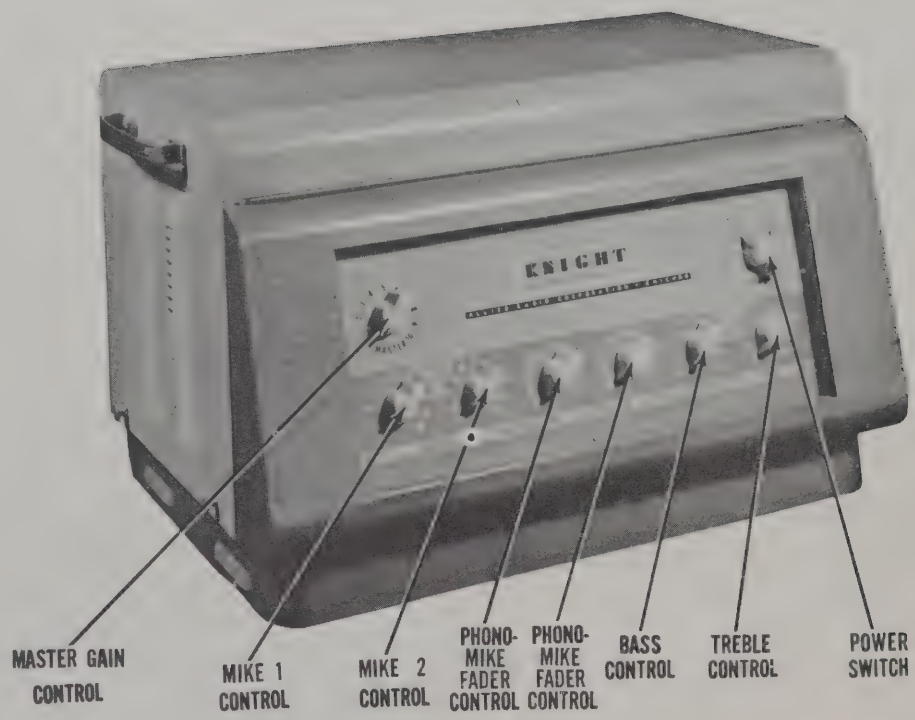
ITEM No.	RATING			REPLACEMENT DATA				INSTALLATION NOTES
	TYP'S RATIO	DC RES.		KNIGHT	STANCOR	THORDAR'N	MERIT	
	PRI. to SEC.	PRI.	SEC.	PART No.	PART No.	PART No.	PART No.	
77	1.6 to 1	570Ω	180Ω CT	LD-0063A	A-4752*	T20D77*	A-2921*	*Drill new mounting holes.

DIAL LIGHT

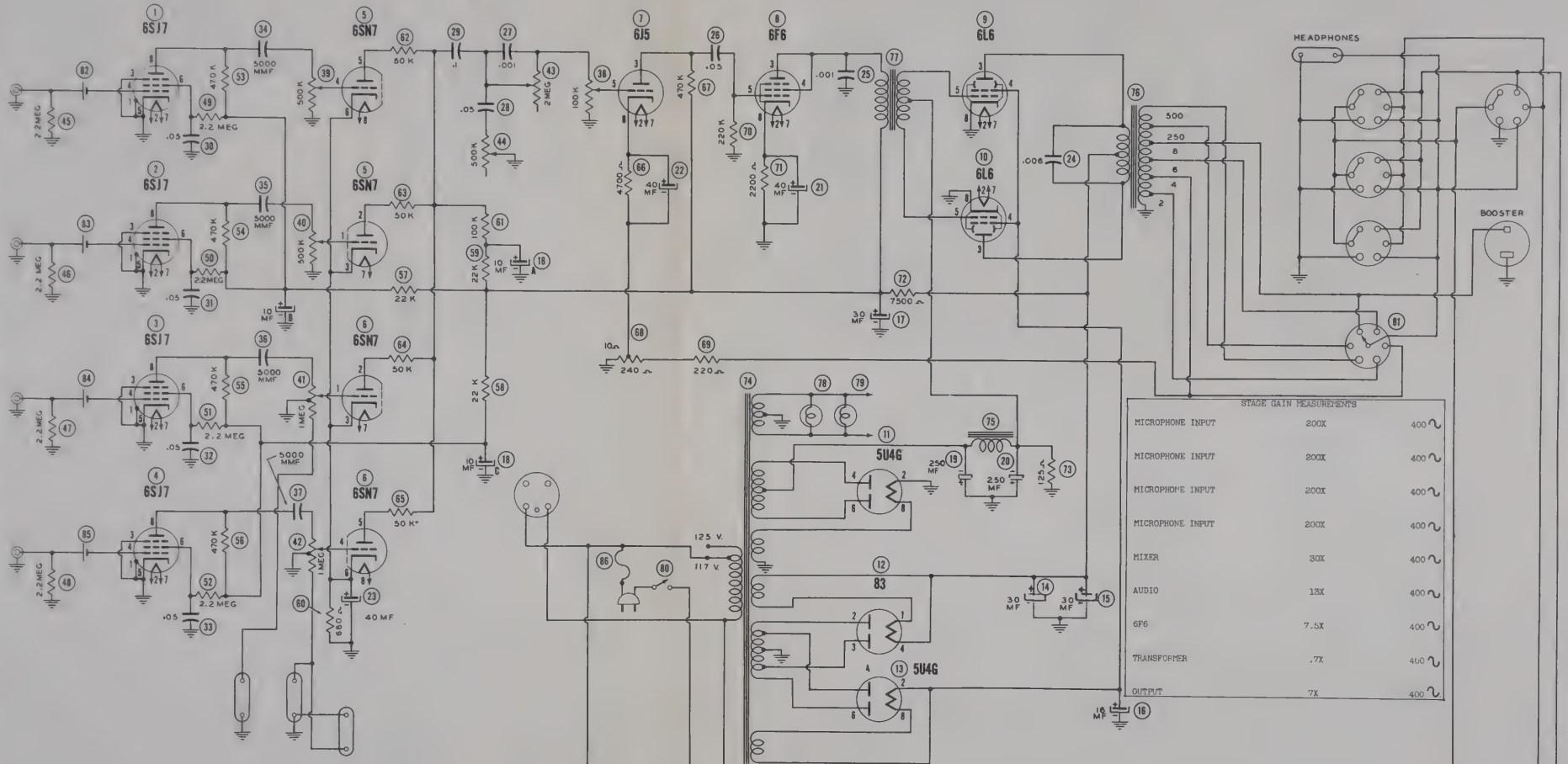
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					KNIGHT PART No.		
78	Bayonet	6-8	0.4	White			Type 55
79	" "	"	"	"			" "

MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
80	Switch		On-Off
81	"		Impedence Selector
82	Bias Cell		
83	" "		
84	" "		
85	" "		
86	Fuse		5 Amp.



DATE 4/48-#4,7-8 SET #33-FOLDER #3



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

MAGIC TONE MODELS
508, 900

MAGIC TONE MODELS
508, 900

MAGIC TONE MODEL 900

TRADE NAME	Magic Tone, Models 508 (Keg Radio), 900 (Keg Lamp Radio)
MANUFACTURER	Radio Development & Research Corp., 233 W. 54th St., New York 19, N. Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver
TUBES (Four)	Types 12BE6 Converter, 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1670KC RATING .22 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1MFD	High side to large stator of tuning capacitor. Low side to B-.	455KC	Tuning capacitor fully open.	Across voice coil	A1,A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	200MMFD	High side to junction of Ant. bank & Ant.Coil (26). Low side to B-.	1670KC	Tuning capacitor fully open.	Across voice coil	A3	Adjust for maximum output.
3	200MMFD	High side to junction of Ant. bank & Ant.Coil (26). Low side to B-.	1450KC	Tune for maximum output.	Across voice coil	A4	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

MAGIC TONE
MODEL 900

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		MAGIC TONE PART No.	STANDARD REPLACEMENT		
1	Converter	12BE6	12BE6	7CH	
2	Det.-AVC-AF	12AT6	12AT6	7BT	
3	Power Output	50B5	50B5	7BZ	
4	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	MAGIC TONE PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
5A	30	150	10018	TA-330	PRSA150-30	EDL3315	M-2X30-150	Filter
B	30	150			30		"	"
6	.1	400	10012	TC-1	484-.1	DT4P1	ST-4-.1	Line Filter
7	.01	400	10017	TC-11	484-01	DT4S1	ST-4-01	Output Plate Bypass
8	.01	400	10017	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
9	.01	400	10017	TC-11	484-01	DT4S1	ST-4-01	" "
10	.05	200	10013	TC-15	484-05	DT4S5	ST-4-05	AVC Filter
11	.1	400	10012	TC-1	484-.1	DT4P1	ST-4-.1	Line Isolation
12	250	500	10016	1FM-325	1468-00025	5W5T25	MO.5-325	Diode Filter
13	100	500	10015	1FM-31	1468-0001	5W5T1	MO.5-31	Osc. Grid
14	5	500		MS-55	1468-00005	5W5V5	MO.5-55	Ant.Coupling - Cer.

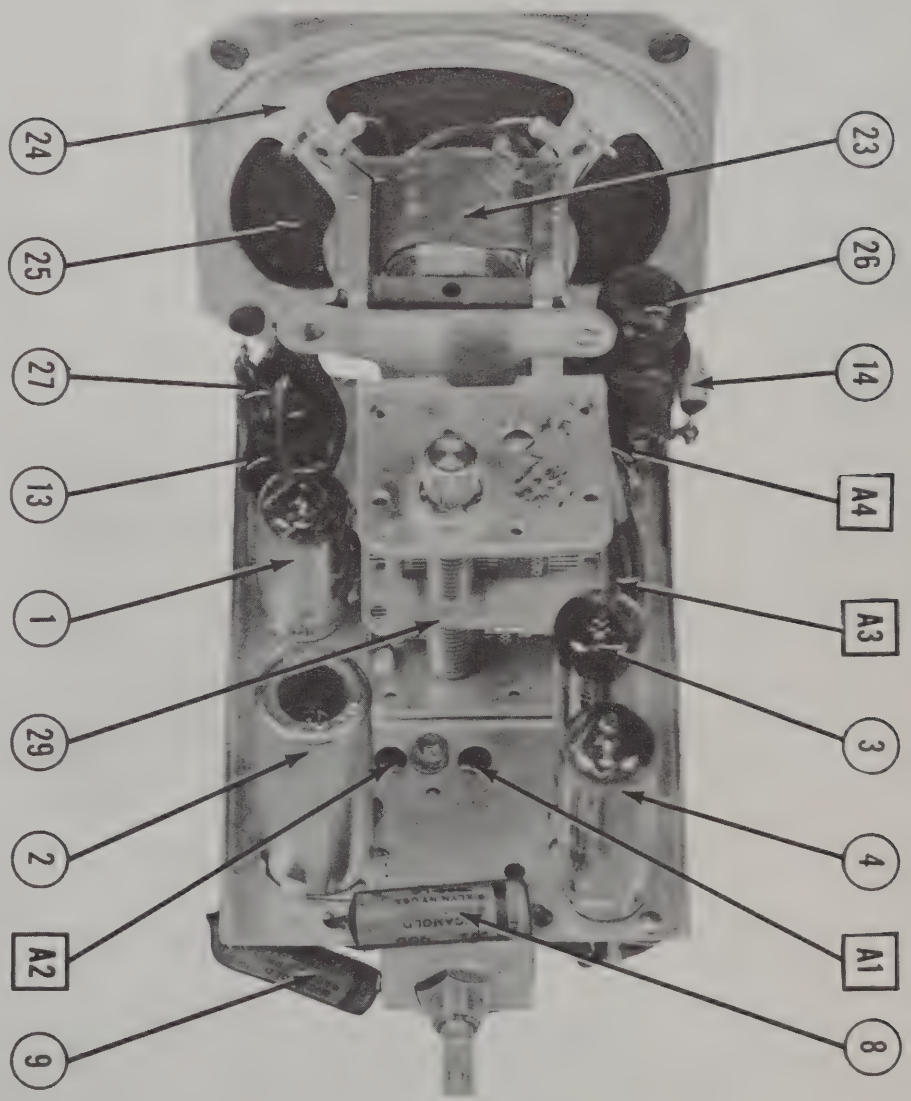
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	MAGIC TONE PART No.	IRC PART No.	CLAROSTAT PART No.	
15A	500KΩ	½	10025-A or B	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 15A per instructions
C	Switch		Not Req.	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MAGIC TONE PART No.	IRC PART No.	
16	22KΩ	½	10019	BTS-22K	Red-Red-Or. Oscillator Grid
17	1 Meg.	½	10020	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
18	6.8 Meg.	½	10021	BTS-6.8 Meg.	Blue-Red-Grn. AF Grid
19	500KΩ	½	10022	BTS-470K	Grn.-Blk.-Yl. AF Plate Load
20	500KΩ	½	10022	BTS-470K	Grn.-Blk.-Yl. Output Grid
21	1300Ω	2		5T-2-1200	Br.-Or.-Red Filter
22	50Ω	2	10023	BW-2-47	Line Dropping

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MAGIC TONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
23	1900Ω	3.3Ω	1[illegible]Ω	.5Ω	10028	A-3876	T22S45	A-2928	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MAGIC TONE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-113†		
24A	PM	3.3Ω	10031 B	Mod.14-X	4A07	†Drill & tap magnet frame
	CONE DIA.	VC DIA.				
25	4 in.	1/2 in.				
24B	PM		10031A			Used in Model 508

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MAGIC TONE PART No.	MEISSNER PART No.	
26	Ant. Coil	33Ω	3Ω	10026	14-1056	
27	Osc. Coil		6Ω	10029	14-1060	
28	Input IF	9Ω	11Ω	10027		

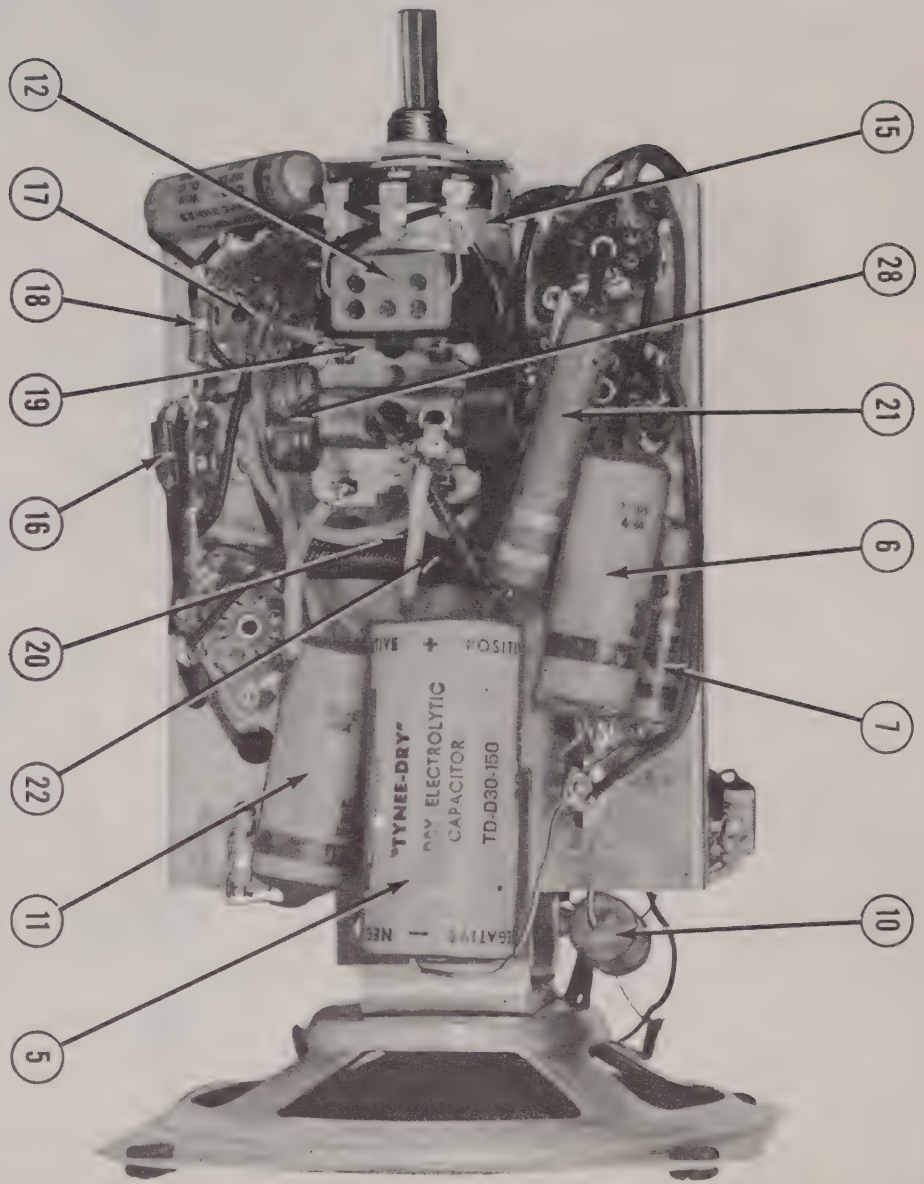
MISCELLANEOUS

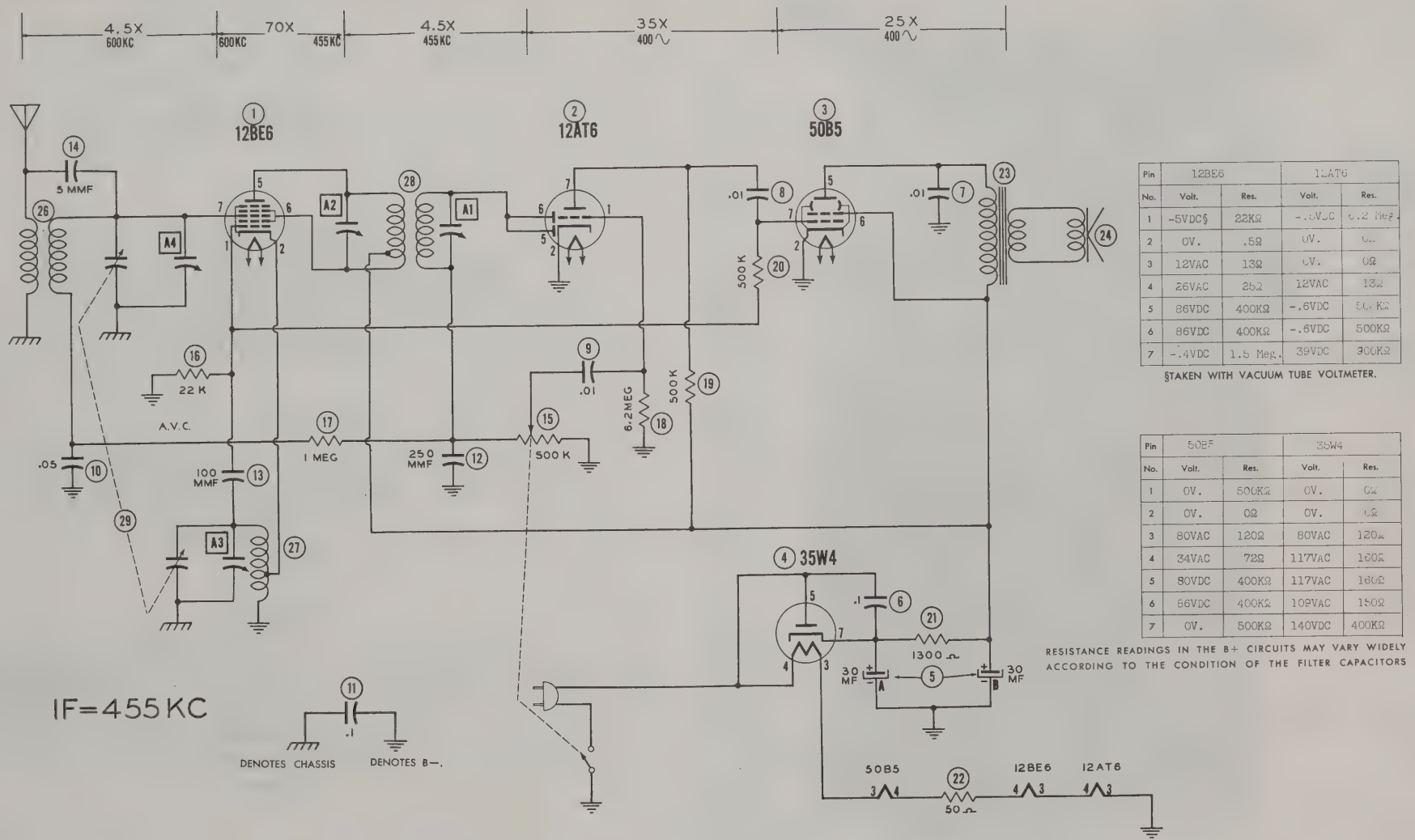
ITEM No.	PART NAME	MAGIC TONE PART No.	NOTES
29	2 Gang Var.Cap.	10014	(19-450 MMFD, 33-199 MMFD)
	Knob	10036	Tuning
	Volume Knob	10039	Model 508
	Volume Knob	10043	Model 900

DISASSEMBLY INSTRUCTIONS

1. Remove volume control knob.
2. Remove tuning control knob.
3. Remove lock nut from volume control shaft.
4. Remove four screws holding cover panel over speaker.
5. Turn chassis one half turn in keg until tuning shaft is lined up with hole in back of keg. Pull chassis out bottom of keg.

CHASSIS—BOTTOM VIEW





Pin No.	12BE6 Volt.	12BE6 Res.	12AT6 Volt.	12AT6 Res.
1	-5VDC§	22KΩ	-.8VDC	0.2 Meg.
2	0V.	.5Ω	0V.	0Ω
3	12VAC	13Ω	0V.	0Ω
4	26VAC	25Ω	12VAC	13Ω
5	86VDC	400KΩ	-.6VDC	80 KΩ
6	86VDC	400KΩ	-.6VDC	500KΩ
7	-.4VDC	1.5 Meg.	39VDC	300KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

Pin No.	50B5 Volt.	50B5 Res.	35W4 Volt.	35W4 Res.
1	0V.	500KΩ	0V.	0Ω
2	0V.	0Ω	0V.	0Ω
3	80VAC	120Ω	80VAC	120Ω
4	34VAC	72Ω	117VAC	160Ω
5	80VDC	400KΩ	117VAC	160Ω
6	86VDC	400KΩ	109VAC	150Ω
7	0V.	500KΩ	140VDC	400KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

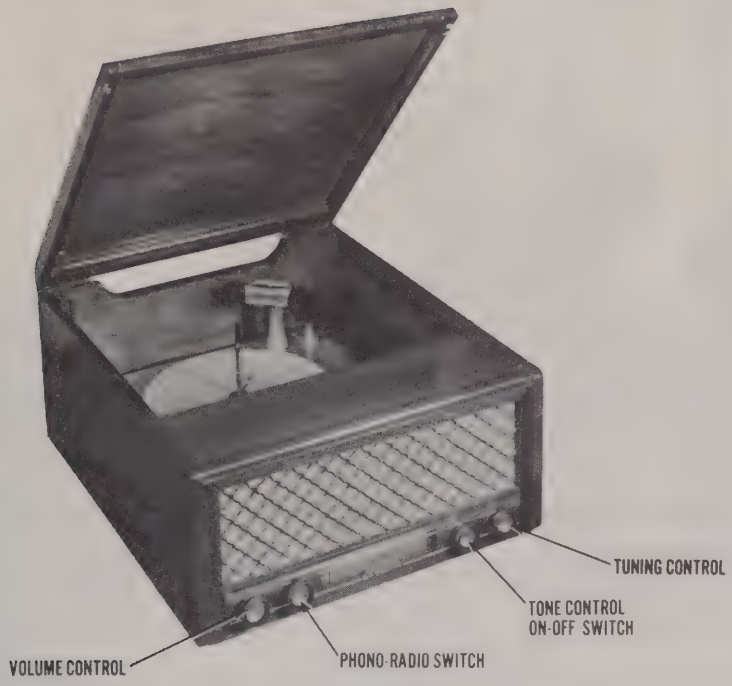
© Howard W. Sams & Co., Inc. 1948

488-9

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

MANTOLA MODEL
R-75152



MANTOLA MODEL
R-75152

MANTOLA MODEL R-75152

TRADE NAME	Mantola, Model R-75152
SUPPLIER	The B. F. Goodrich Co., 500 S. Main St., Akron, Ohio
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Ant.
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	105-125 Volts AC
TUNING RANGE—BROADCAST	540-1600KC RATING .23 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Steps 1 & 2 may be done with loop disconnected if a 50KΩ resistor is connected from rear stator of tuning capacitor to tuning capacitor frame.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to pin 7 (Grid) 12BE6. Low side to B-. (See pre-alignment notes.)	455KC	Tuning capacitor fully open.	Across voice coil	A1, A2 A3, A4	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	.1 MFD.	High side to pin 7 (Grid) 12BE6. Low side to B-. (See pre-alignment notes.)	1620KC	Tuning capacitor fully open	Across voice coil	A5	Adjust for maximum output. Install receiver in cabinet.
3		Loop	1400KC	Tune for maximum output.	Across voice coil	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove eight Phillips head wood screws holding cover board over bottom of cabinet. Remove cover board from cabinet.
3. Unsolder phono-motor leads.
4. Unsolder phono pickup leads.
5. Unsolder antenna leads from antenna trimmer.
6. Unsolder ground lead from under record changer.
7. Remove two hex head screws holding chassis in cabinet. Remove chassis from cabinet.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

MANTOLA
MODEL R-75152

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		MANTOLA PART No.	STANDARD REPLACEMENT		
1	Converter	12BE6	12BE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	12AT6	12AT6	7BT	
4	Power Output	50B5	50B5	7BZ	
5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	MANTOLA PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
6A	40	150	B-9564-1	TA-240	PRSA150-20-40	BRD4215	DSB-2X40-150	Filter - Red
B	20	150						" - Blue
7	.05	400	BD410503	TC-15	484-05	DT4S5	ST-4-05	Line Filter
8	.05	400	BD410503	TC-15	484-05	DT4S5	ST-4-05	Line Isolation
9	.02	400	BD410203	TC-12	484-02	DT4S2	ST-4-02	Tone Compensation
10	.003	600	BD610302	TC-23	684-003	DT6D3	ST-6-003	" "
11	.01	400	BD410103	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
12	.1	400	BD410104	TC-1	484-1	DT4P1	ST-4-1	AF Plate Decoupling
13	.01	400	BD410103	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
14	.1	400	BD410104	TC-1	484-1	DT4P1	ST-4-1	Phono Isolation
15	.05	200	BD210503	TC-15	48-05	DT4S5	ST-4-05	AVC Filter
16	220	500	BM74A221	1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass
17	100	500	BM74A101	1FM-31	1468-0001	5W5T1	MO.5-31	Osc. Grid Cap

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	MANTOLA PART No.	IRC PART No.	CLAROSTAT PART No.	
18A	500KΩ	½	B-54466-2	D13-133	AM-60-2	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 18A per instructions.
19A	500KΩ	½	B-57841-1	D13-133	AM-60-2	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 19A per instructions.
C	Switch		Not Req.	41	SW-A	" " " " "

RESISTORS

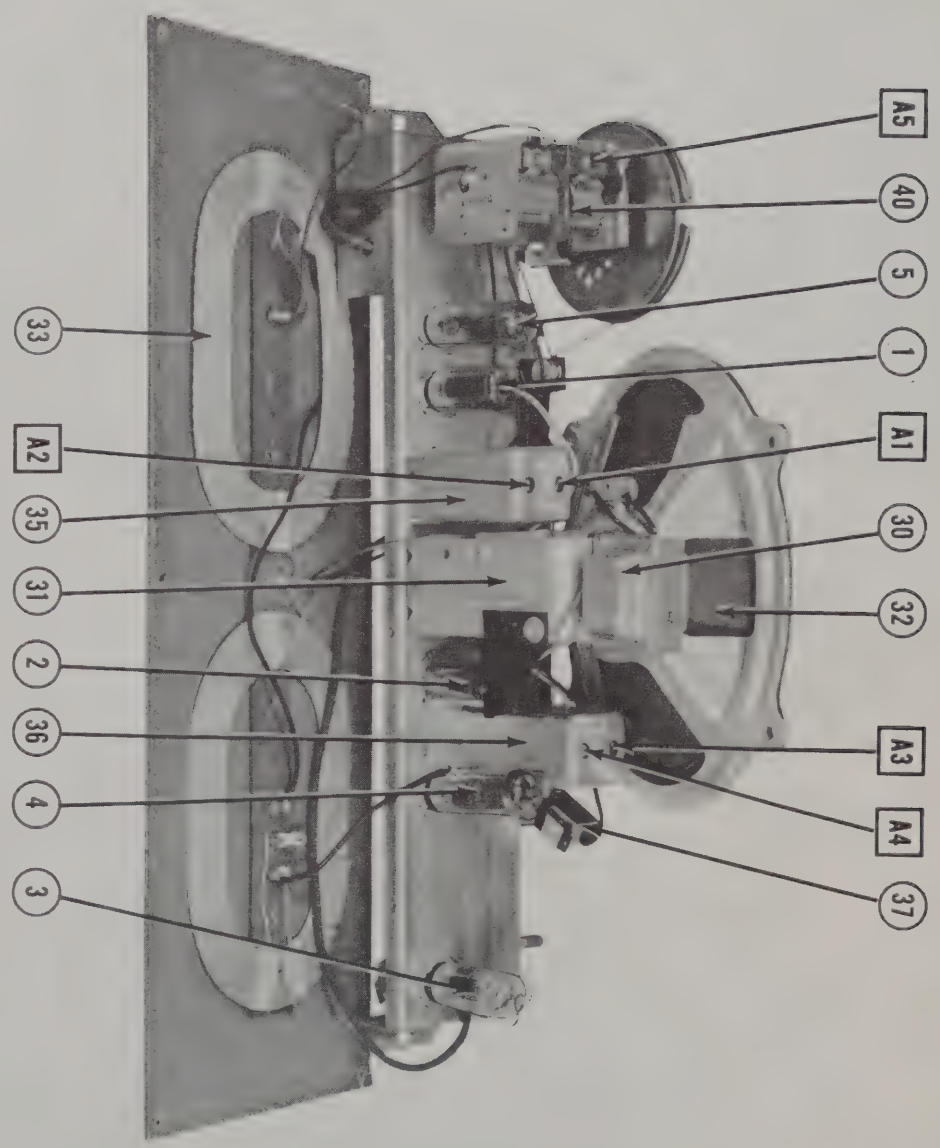
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MANTOLA PART No.	IRC PART No.	
20	22KΩ	⅓	BR17B223	BTS-22K	Red-Red-Or. Oscillator Grid.
21	68Ω	⅓	BR16B680	BW-½-68	Blue-Gray-Blk. IF Cathode
22	3.3 Meg.	⅓	BR17B335	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
23	6.8 Meg.	⅓	BR17B685	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
24	220KΩ	⅓	BR17B224	BTS-220K	Red-Red-Yl. AF Plate Load
25	100KΩ	⅓	BR17B104	BTS-100K	Br.-Blk.-Yl. AF Plate Decoupling
26	150Ω	½	B16C151	BW-½-150	Br.-Grn.-Br. Output Cathode
27	15KΩ	1	BR17E153	BTA-15K	BR.-Grn.-Or. Bleeder
28	1500Ω	1	BR17E152	BTA-1500	Br.-Grn.-Red Filter
29	33Ω	1		BW-½-33	Or.-Or.-Blk. Surge Limiter - See Note

Note: Not used in all models.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MANTOLA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
30	2200Ω	3.0Ω	245Ω	.7Ω	Part of C-57843	A-3876*	T22S45*	A-2928*	*Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: MANTOLA PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.				
31	PM	3.6Ω	C-57843			
	CONE DIA.	VC DIA.				
32	4-15/16" X 7-1/8"	3/4"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: MANTOLA PART No.	MEISSNER PART No.
33	Loop Ant.	.1Ω	1.7Ω	D-57870	
34	Osc. Coil	1Ω	5.7Ω	B-57842	14-1060
35	Input IF	.25Ω	19Ω	B-56722-1	16-6666
36	Output IF	.19Ω		B-56718-1	16-6670

DIAL LIGHT

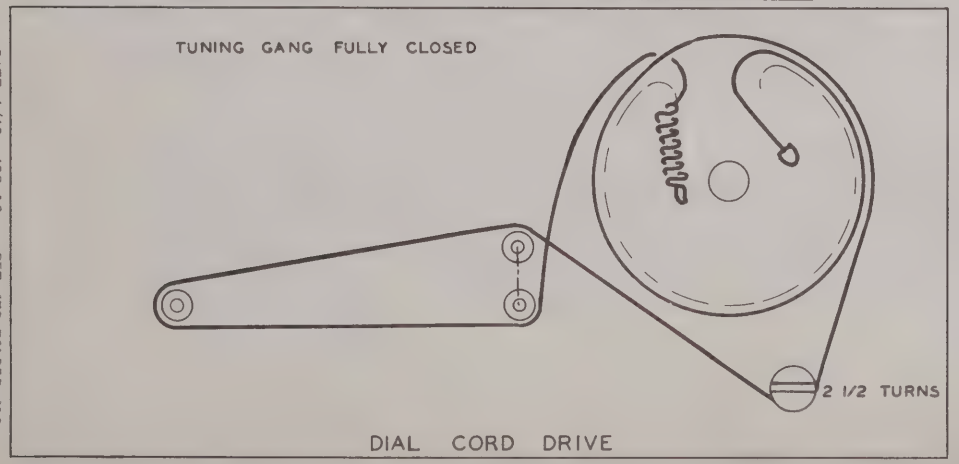
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: MANTOLA PART No.		INSTALLATION NOTES
37	Bayonet	6-8V	0.15A	Brown	A-6158		Type 47

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA: MANTOLA PART No.	ASTATIC PART No.	REMARKS
38		L-70-A	L-70 Original Part

MISCELLANEOUS

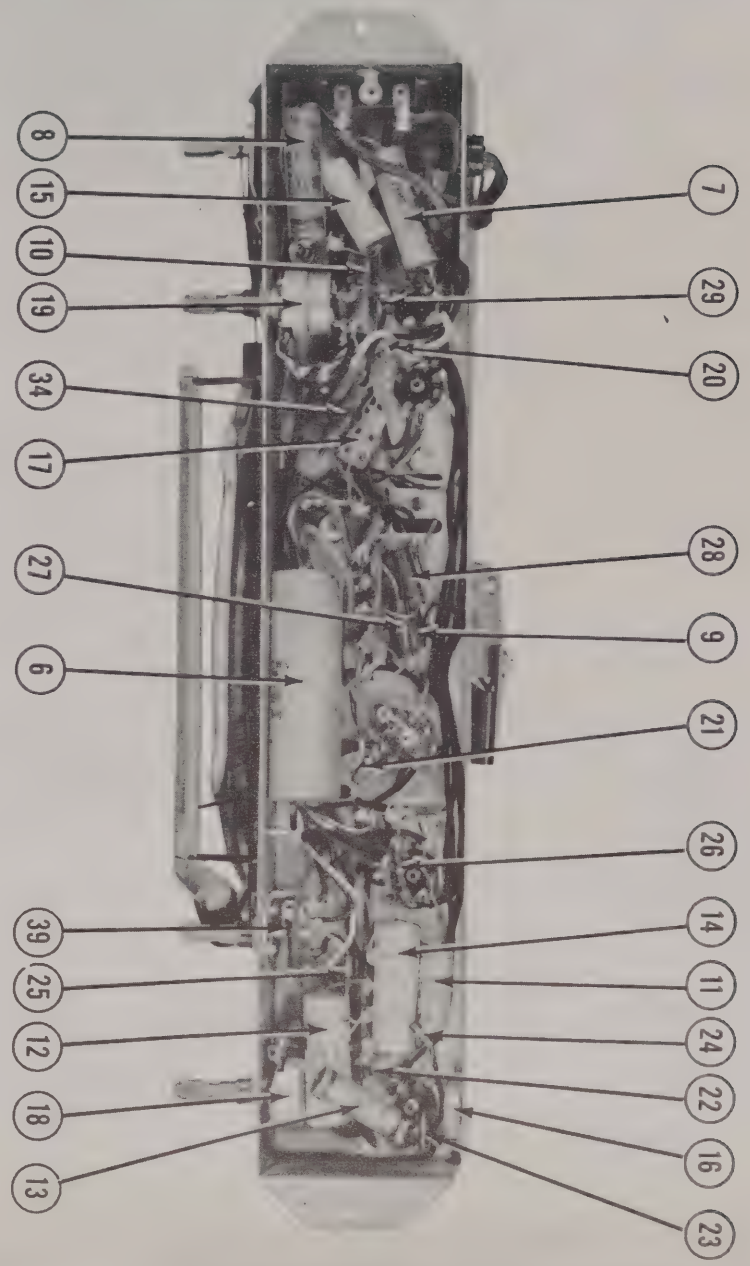
ITEM No.	PART NAME	MANTOLA PART No.	NOTES
39	Switch	B-51576-2	Radio-Phono
40	2 Gang Var.Cap.	C-57959-1	(12-455 MMFD. 30-190 MMFD.)
A6	Trimmer	B-57879-1	Ant. ADJ.
	Dial Pointer	B-57857-1	
	Knob	C-57972-1	
	Dial	C-59414	Crystal and indicator



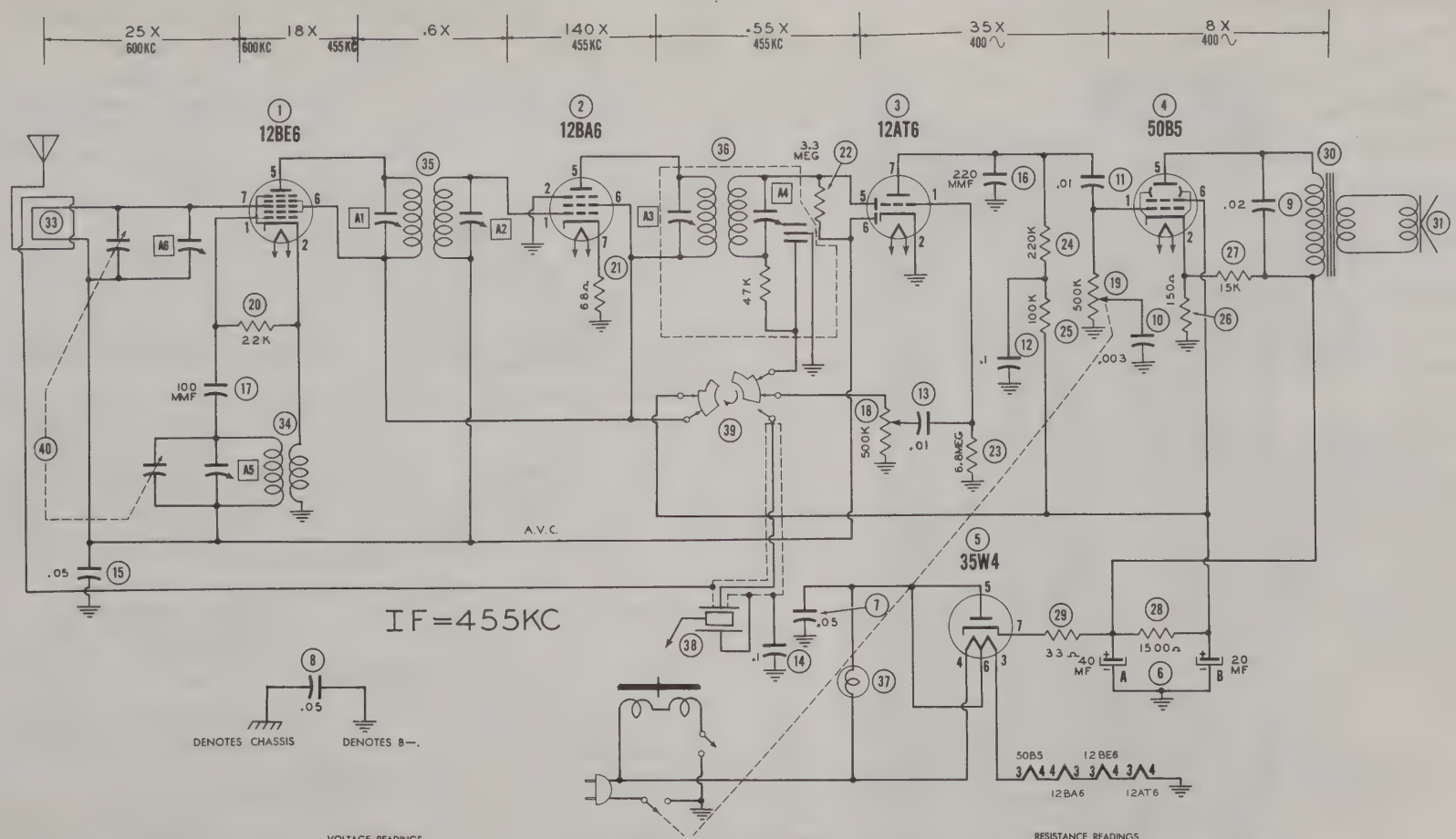
DATE 4/48-#488-10 SET #38-FOLDER #10

MANTOLA MODEL R-7515?

CHASSIS—BOTTOM VIEW



MANT 1A MODEL R-7515?



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	-9VDC§	0V.	25VAC	12VAC	82VDC	82VDC	-.3VDC
2	12BA6	-.7VDC	0V.	25VAC	37VAC	82VDC	82VDC	.8VDC
3	12AT6	-.6VDC	0V.	12VAC	0V.	-.3VDC	-.3VDC	55VDC
4	50B5	0V.	5.5VDC	87VAC	37VAC	110VDC	82VDC	0V.
5	35W4	117VDC	0V.	87VAC	117VAC	115VAC	115VAC	120VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	22KΩ	1Ω	24Ω	13Ω	15KΩ	15KΩ	3.8 Meg
2	12BA6	3.8 Meg.	0Ω	24Ω	36Ω	15KΩ	15KΩ	68Ω
3	12AT6	6.8 Meg.	0Ω	13Ω	0Ω	550KΩ	3.8 Meg	335KΩ
4	50B5	500KΩ	150Ω	85Ω	36Ω	15KΩ	15KΩ	500KΩ
5	35W4	15KΩ	INF.	85Ω	115Ω	110Ω	110Ω	15KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

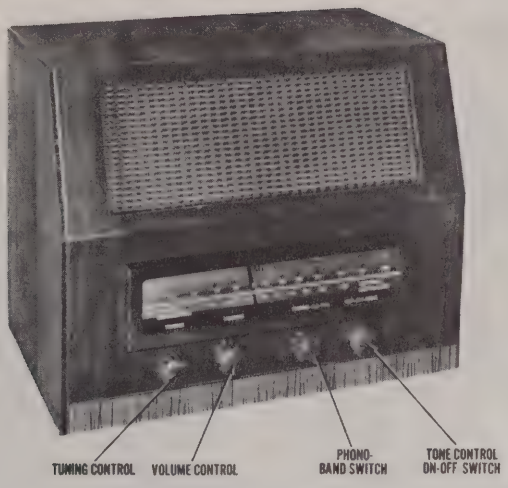
A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

488-10

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.



MECK MODEL CR-500

TRADE NAME	Meck, Model CR-500
MANUFACTURER	John Meck Industries, Plymouth, Indiana
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (TEN)	Types, 6BE6 AM Converter, 6BE6 FM Converter, 6BA6 1st IF Amp., 6BA6 2nd IF Amp., 6BA6 Driver, 6H6 Ratio Det., 6AT6 Det.-AVC-AF, 6BA6 2nd AF, 25L6GT Power Output, 25Z6GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC — RATING .38 Amp. @ 117 Volts AC
TUNING RANGE--BROADCAST	540-1750KC — FREQ. MOD. 87.5-108.5MC

ALIGNMENT INSTRUCTIONS--READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of AM tuning cap. Low side to chassis.	455KC	BC (center position)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy antenna to .001 MFD. to reduce hum modulation.
2		Loop	1750KC	"	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver.
3		"	1500KC	"	Tune for maximum output.	"	A6	Adjust for maximum output

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
4	.01 MFD	High side to Pin 1 (grid) 6BA6 2nd IF Tube (4). Low side to chassis.	10.7MC (unmodulated)	FM (fully clockwise)	Tuning cap. fully open.	DC probe to Point (A). Common to chassis.	A7	Adjust for maximum deflection.
5	.01 MFD	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	"	"	"	"	A8,A9	"
6	.01 MFD	High side to Pin 7 (grid) 6BE6 FM Converter Tube (2). Low side to chassis.	"	"	"	"	A10,A11	"
7	.01 MFD.	High side to rear stator of AM tuning cap. Low side to chassis.	"	"	"	DC probe to Point B . Common to chassis	A12	Adjust for zero deflection. Continue with FM RF Alignment Step 8.

FOR ALTERNATE FM AND FM RF ALIGNMENT SEE PAGE 4 OF THIS FOLDER

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 4/48-#488-11 SET #38-FOLDER #11

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		MECK PART No.	STANDARD REPLACEMENT		
1	AM Converter	6BE6	6BE6	7CH	
2	FM Converter	6BE6	6BE6	7CH	
3	1st IF Amp.	6BA6	6BA6	7BK	
4	2nd IF Amp.	6BA6	6BA6	7BK	
5	Driver	6BA6	6BA6	7BK	
6	Ratio Det.	6H6	6H6	7Q	
7	Det.-AVC-AF	6AT6	6AT6	7BT	
8	2nd AF	6BA6	6BA6	7BK	
9	Power Output	25L6GT	25L6GT	7AC	
10	Rectifier	25Z6GT	25Z6GT	7Q	

CAPACITORS

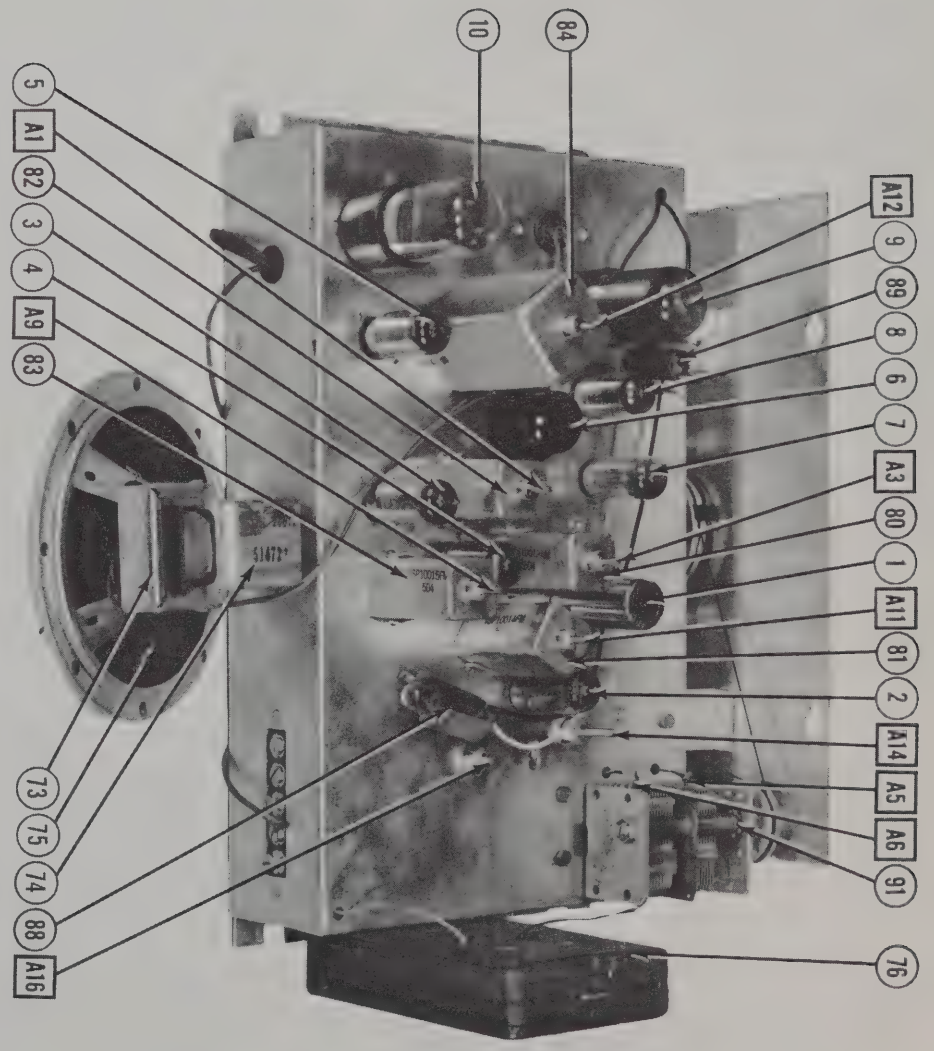
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	MECK PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
11A	50	150	CLP-10012	PRS-A40302	EZ42215	DSB-403020-150	UT-501	Filter - Red
B	20	150					" - White	
C	20	150					TA-220	" - "
12	8	25		PRS25-10	BR102A	M-10-25	TA-10	Stabilizing Cap.
13	.05	400		484-05	DT4S5	ST-4-05	TC-15	Line Filter
14	.01	400		484-01	DT4S1	ST-4-01	TC-11	Output Plate Bypass
15	.005	600		684-005	DT6D5	ST-6-005	TC-25	Tone Compensation
16	.01	400		484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
17	.01	400		484-01	DT4S1	ST-4-01	TC-11	" "
18	.005	600		684-005	DT6D5	ST-6-005	TC-25	" "
19	.05	400		484-05	DT4S5	ST-4-05	TC-15	" "
20	.005	600		684-005	DT6D5	ST-6-005	TC-25	De-emphasis
21	.005	600		684-005	DT6D5	ST-6-005	TC-25	Driver Decoupling
22	.01	200		484-01	DT2S1	ST-4-01	TC-11	Driver Cathode Bypass
23	.005	600		684-005	DT6D5	ST-6-005	TC-25	2nd IF Decoupling
24	.005	600		684-005	DT6D5	ST-6-005	TC-25	2nd IF Cathode Bypass
25	.05	200		484-05	DT2S5	ST-4-05	TC-15	AVC Filter
26	.01	400		484-01	DT4S1	ST-4-01	TC-11	1st IF Decoupling
27	.005	600		684-005	DT6D5	ST-6-005	TC-25	1st IF Cathode Bypass
28	.01	400		484-01	DT4S1	ST-4-01	TC-11	Conv. Decoupling
29	.1	200		484-.1	DT2P1	ST-2-1	TC-1	Phono Isolation
30	.01	400		484-01	DT4S1	ST-4-01	TC-11	Fil. Bypass
31	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Line Filter-Cer.
32	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Line Ant. Coupling-Cer.
33	500	500		1468-0005	5W5T5	MO.5-35	1FM-35	Fil. Bypass-Cer.
34	110	500		1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
35	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	" " " -Cer.
36	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	Diode Load Cap.-Cer.
37	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	" " " "
38	500	500		1468-0005	5W5T5	MO.5-35	1FM-35	IF Coupling-Cer.
39	500	500		1468-0005	5W5T5	MO.5-35	1FM-35	Conv. Decoup.-Cer.
40	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
41	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	" " " "

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	MECK PART No.	IRC PART No.	CLAROSTAT PART No.	
42A	1 Meg.	½		D13-137	M-63-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 42A per instructions
43A	1 Meg.	½		D13-137	M-63-Z	Tone Control
B	Shaft			A	Not Req.	Attach to 43A per instructions
C	Switch			41	SW-A	" " " " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MECK PART No.	IRC PART No.	
44	22KΩ	½		BTS-22K	Red-Red-Or. FM Oscillator Grid
45	22KΩ	½		BTS-22K	Red-Red-Or. AM Oscillator Grid
46	1000Ω	½		BTS-1000	Br.-Blk.-Red FM Converter Decoupling
47	150Ω	½		BW-½-150	Br.-Grn.-Br. 1st IF Cathode
48	1000Ω	½		BTS-1000	Br.-Blk.-Red 1st IF Decoupling
49	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
50	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. " "
51	180KΩ	½		BTS-180K	Br.-Gray-Yl. Diode RF Filter
52	150Ω	½		BW-½-150	Br.-Grn.-Br. 2nd IF Cathode
53	6800Ω	½		BTS-6800	Blue-Gray-Red 2nd IF Plate Load
54	1000Ω	½		BTS-1000	Br.-Blk.-Red 2nd IF Decoupling
55	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Driver Grid
56	150Ω	½		BW-½-150	Br.-Grn.-Br. Driver Cathode
57	1000Ω	½		BTS-1000	Br.-Blk.-Red Driver Decoupling
58	150Ω	½		BW-½-150	Br.-Grn.-Br. Balancing Network
59	6800Ω	½		BTS-6800	Blue-Gray-Red Ratio Detector Diode Load
60	6800Ω	½		BTS-6800	Blue-Gray-Red " " " "
61	22KΩ	½		BTS-22K	Red-Red-Or. De-emphasis
62	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue 1st AF Grid
63	100KΩ	½		BTS-100K	Br.-Blk.-Yl. 1st AF Plate Load
64	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. 2nd AF Grid
65	330Ω	½		BW-½-330	Or.-Or.-Br. 2nd AF Cathode
66	6800Ω	½		BTS-6800	Blue-Gray-Red 2nd AF Plate Load
67	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
68	150Ω	1		BW-1-150	Br.-Grn.-Br. Output Cathode
69	1000Ω	1		BTA-1000	Br.-Blk.-Red Filter
70	330Ω	1		BW-1-330	Or.-Or.-Br. "
71	33Ω	1		BW-1-33	Or.-Or.-Blk. Pilot Light Shunt
72	33Ω	5			Line Dropping

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MECK PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
73	2300Ω	3.4Ω	190Ω	.4Ω		A-3876*	T22845*	A-2928*	*Bend mounting tabs down, file out slots and mount on original bracket.

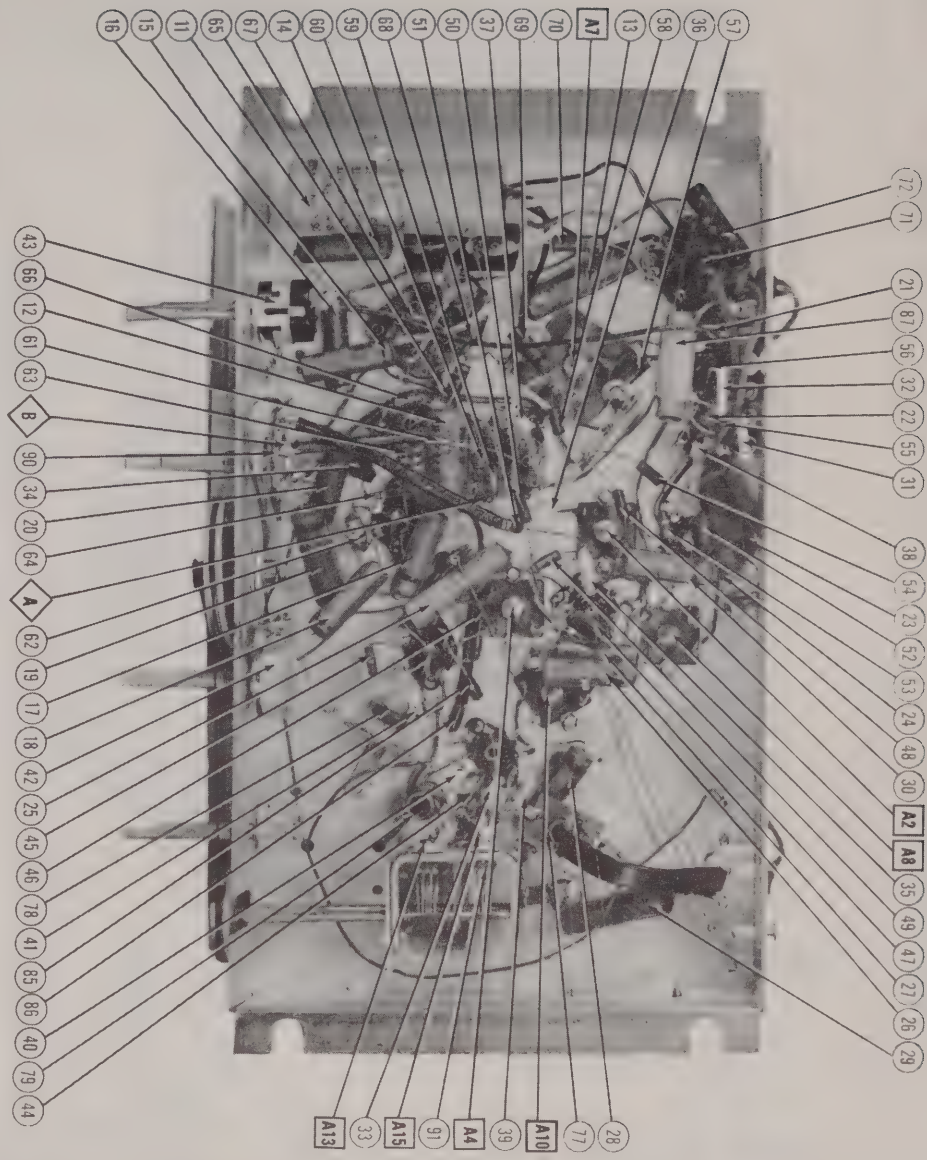
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MECK PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-107		
74	PM	3.4Ω	SRP-10011	Mod. P5-V	5A1	
	CONE DIA.	VC DIA.				
75	4-3/4"	1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MECK PART No.	MEISSNER PART No.	
76	Loop Ant.		2.3Ω			
77	FM Ant.Coil	0Ω	0Ω			
78	BC Osc. "		4.8Ω		14-1060	
79	FM " "		0Ω			
80	AM Input IF	15.5Ω	15.5Ω	TSP-10013		
81	FM " "	.4Ω	.3Ω	TSP-10014		
82	AM OutputIF	16.2Ω	16Ω	TSP-10012		
83	FM " "	.4Ω	.3Ω	TSP-10015		
84	Dis. Trans.	.2Ω	.1Ω	TSP-10007		
85	RF Fil.Chk.		1Ω			
86	" " "		1Ω			
87A	Line Choke		.1Ω			
B	" "		.1Ω			

CHASSIS—BOTTOM VIEW



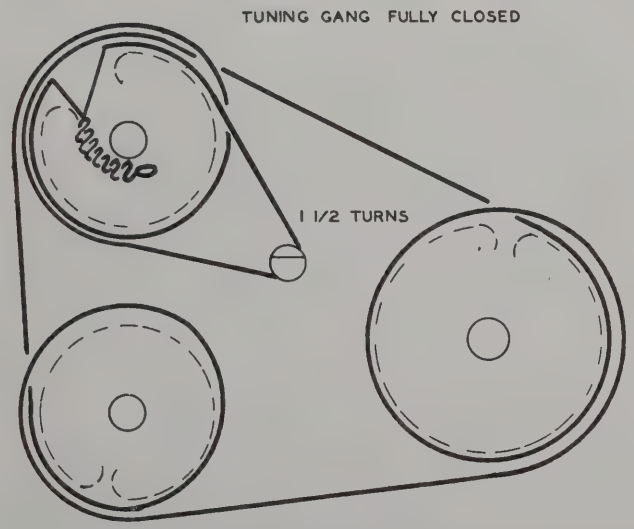
PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					MECK PART No.		
88	Bayonet	3.2	0.16	Black			Type 1490
89	"	"	"	"			" "

MISCELLANEOUS

ITEM No.	PART NAME	MECK PART No.	NOTES
90	Switch		Band
91	2 Gang Var. Cap		(30-458MMF, 34-191MMF)



DIAL CORD DRIVE

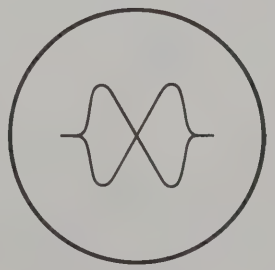


FIG. 2

FIG. 1

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal 60∿ modulation 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

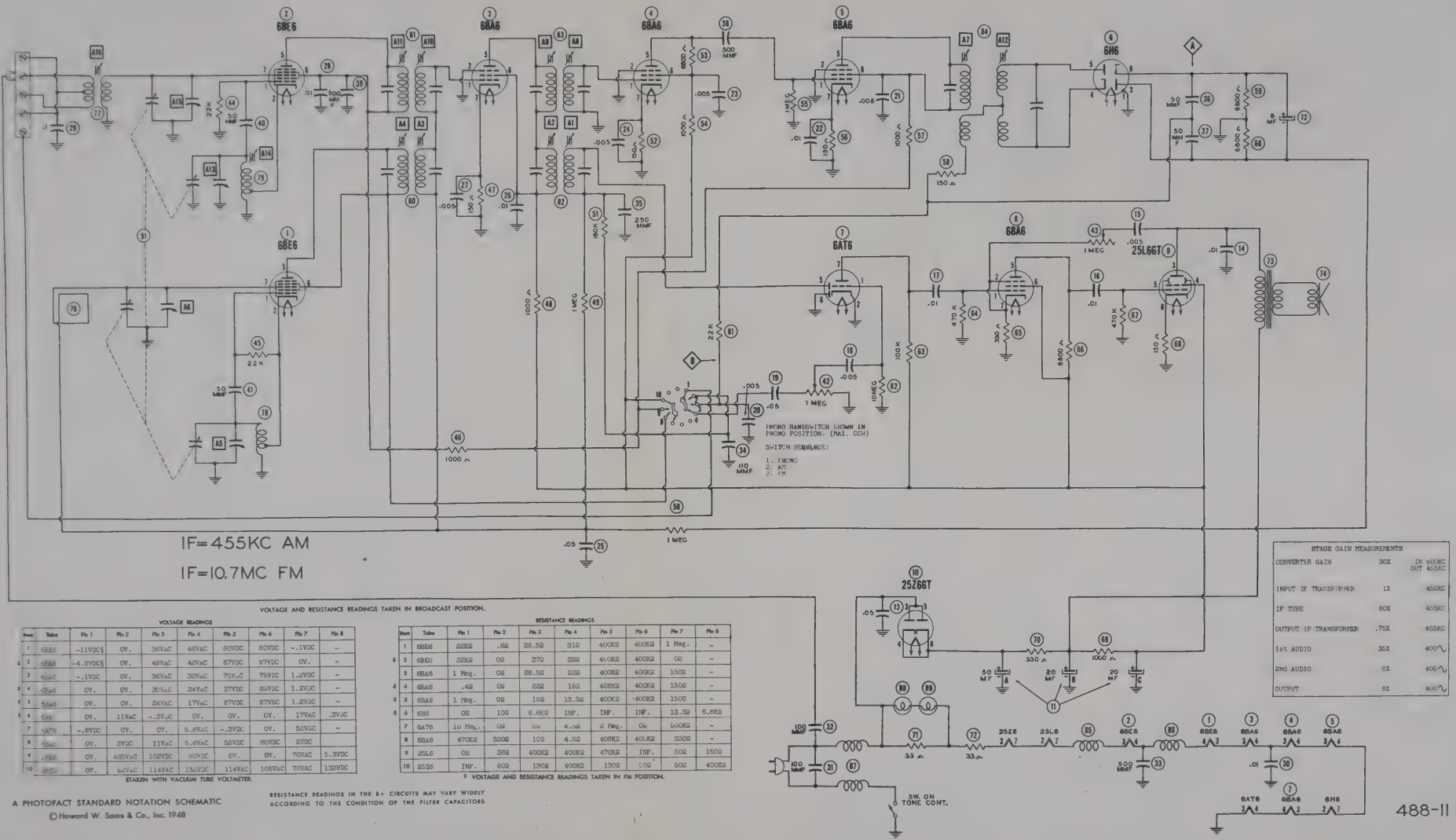
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
4	.01 MFD.	High side to Pin 1 (grid) 6BA6 1st IF Tube (3). Low side to chassis.	10.7MC (freq. modulated)	FM (fully clock-wise)	Tuning cap. fully open.	Vertical input to Point (A). Ground to chassis.	A7,A8, A9	Disconnect 8 MFD cap. from Point (A). Adjust A7,A8,& A9 for maximum amplitude, symmetry & coincidence of pattern per Fig. 1.
5	.01 MFD.	Unsolder lead to Pin 7 of 6BE6 FM Converter Tube (2). Connect 100 KΩ resistor from Pin 7 to chassis. High side sig. gen. to Pin 7. Low side to chassis.	"	"	"	"	A10, A11	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
6	.01 MFD.	"	"	"	"	Vertical input to Point (B). Ground to chassis.	A12	Reconnect 8 MFD. cap. to Point (A). Adjust A12 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with FM RF alignment Step 8.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8	2 150Ω carbon res.	Each side in series with 150Ω res. to FM dipole terminals "3" & "4".	108.5MC (unmodulated)	FM	Tuning cap. fully open.	DC probe to Point A . Common to chassis	A13	Adjust for maximum deflection.
9	"	"	87.5MC	"	Tuning cap. fully closed	"	A14	Adjust for maximum deflection. Repeat Steps 8 & 9 until no further improvement can be made.
10	"	"	106MC	"	Tune for max. deflection.	"	A15	Rock tuning cap. and adjust for maximum deflection.
11	"	"	92MC	"	"	"	A16	Rock tuning cap. and adjust for maximum deflection. Repeat Steps 8,9, 10 & 11 until no further improvement can be made.

FOR AM ALIGNMENT AND ALTERNATE FM ALIGNMENT SEE FRONT PAGE

DATE 4/46-#488-11 SET #38-FOLDER #11



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BE6	-11VDC‡	0V.	36VAC	46VAC	80VDC	80VDC	-.1VDC	-
‡ 2	6BE6	-4.2VDC‡	0V.	48VAC	42VAC	67VDC	67VDC	0V.	-
3	6BA6	-.1VDC	0V.	36VAC	30VAC	75VDC	75VDC	1.2VDC	-
‡ 4	6BA6	0V.	0V.	30VAC	24VAC	37VDC	86VDC	1.2VDC	-
‡ 5	6BA6	0V.	0V.	24VAC	17VAC	67VDC	67VDC	1.2VDC	-
‡ 6	6H6	0V.	11VAC	-.3VDC	0V.	0V.	0V.	17VAC	.3VDC
7	6AT6	-.6VDC	0V.	0V.	5.8VAC	-.3VDC	0V.	58VDC	-
8	6BA6	0V.	2VDC	11VAC	5.8VAC	52VDC	80VDC	2VDC	
9	25L6	0V.	405VAC	102VDC	80VDC	0V.	0V.	70VAC	5.3VDC
10	25Z6	0V.	342VAC	114VAC	134VDC	114VAC	105VAC	70VAC	132VDC

‡TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BE6	22KΩ	.6Ω	26.5Ω	31Ω	400KΩ	400KΩ	1 Meg.	-
‡ 2	6BE6	22KΩ	0Ω	37Ω	32Ω	400KΩ	400KΩ	0Ω	-
3	6BA6	1 Meg.	0Ω	26.5Ω	22Ω	400KΩ	400KΩ	150Ω	-
‡ 4	6BA6	.4Ω	0Ω	22Ω	18Ω	408KΩ	400KΩ	150Ω	-
‡ 5	6BA6	1 Meg.	0Ω	18Ω	13.5Ω	400KΩ	400KΩ	150Ω	-
‡ 6	6H6	0Ω	10Ω	6.8KΩ	INF.	INF.	INF.	13.5Ω	6.8KΩ
7	6AT6	10 Meg.	0Ω	0Ω	4.0Ω	2 Meg.	0Ω	600KΩ	-
8	6BA6	470KΩ	320Ω	10Ω	4.5Ω	408KΩ	400KΩ	320Ω	-
9	25L6	0Ω	38Ω	400KΩ	400KΩ	470KΩ	INF.	50Ω	150Ω
10	25Z6	INF.	60Ω	130Ω	400KΩ	130Ω	130Ω	50Ω	400KΩ

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

STAGE GAIN MEASUREMENTS

CONVERTER GAIN	30X	IN 600KC OUT 455KC
INPUT IF TRANSFORMER	1X	455KC
IF TUBE	60X	455KC
OUTPUT IF TRANSFORMER	.75X	455KC
1st AUDIO	35X	400∿
2nd AUDIO	8X	400∿
OUTPUT	8X	400∿

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1948

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

488-11

MOTOROLA
MODEL 408

MOTOROLA
MODEL 408

MOTOROLA MODEL 408

TRADE NAME	Motorola, Model 408
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago 7, Ill.
TYPE SET	Battery Operated Universal Automotive Superheterodyne Receiver
TUBES (SIX)	Types, 6BA6 RF Amp., 6BE6 Converter, 6BA6 IF Amp., 6AT6 Det.-AVC-AF, 6V6GT Power Output, 6X4 Rectifier.
POWER SUPPLY	6 Volt Storage Battery
TUNING RANGE—BROADCAST	535-1600KC RATING 6.3 Amp. @ 6.3 Volts DC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	455KC	Tuning control fully clockwise.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	60 MMFD and 21" coaxial lead. Capacitor at gen. end	Antenna receptacle.	1600KC	Tuning control fully clockwise. Cores are to be projecting 1-1/8" from ends of cans.	"	A5,A6, A7.	Adjust for maximum output in order given.
3	"	"	1425KC	Shaft coupling one full turn from fully clockwise.	"	A8,A9, A10	Adjust cores for maximum output. Mark manual tuning shaft coupling to indicate full turn.
4	"	"	Gen. power off but leave connected.	Four more full turns in.	"	A11	Adjust for maximum noise.
5				1400KC		A7	Install set in car and connect antenna. Adjust for maximum noise.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

MOTOROLA MODEL 408

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6BE6	6BE6	7CH	
3	IF Amp.	6BA6	6BA6	7BK	
4	Det.-AVC-AF	6AT6	6AT6	7BT	
5	Power Output	6V6GT	6V6GT	7AC	
6	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	30	350	23A473015		UP2245C	DY-312	EL-32	■ Filter
B	30	300			BR1045	M-10-450		▲ "
C	20	25					TA-25	Output Cathode Bypass
8	.5	100	8A17028					Hash Filter
9	.5	100	8A17028					" "
10	.006	1600	8A12840	1684-006	MD16D6	STM-16-006	TR-26	Buffer
11	.01	400	8K23690	484-01	DT4S1	ST-4-01	TC-11	Tone Compensation
12	.03	400	8A71911	484-03	DT4S3	ST-4-03	TC-13	Audio Coupling
13	.05	100	8A13514	484-05	DT4S5	ST-4-05	TC-15	" "
14	.05	400	8A14791	484-05	DT4S5	ST-4-05	TC-15	Screen Bypass
15	.1	400	8K13166	484-1	DT4P1	ST-4-1	TC-1	Decoupling
16	.05	100	8A13514	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
17	.05	100	8A13514	484-05	DT4S5	ST-4-05	TC-15	Cathode Bypass
18	.006	100	8A4529	484-006	DT6D6	ST-6-006	TC-26	RF Coupling
19	500	500	21R6639	1468-0005	5W5T5	MO.5-35	1FM-35	AF Plate Bypass
20	50	300	21R6513	1468-00005	5W5Q5	MO.5-45	1FM-45	IF Coupling-Cer.
21A	100	500	*	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter-Cer.
B	100	500	*	1468-0001	5W5T1	MO.5-31	1FM-31	" " " "
22	50	300	21R6513	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
23	400	500	21A71672	1469-0004	5R5T4	MOS.5-34	MS-34	Fixed Trimmer-Cer.
24	5	500	21K70720	1468-000005	5W5V5	MO.5-55	MS-55	RF Coupling-Cer.
25	100	500	21B77562	1468-0001	5W5T1	MO.5-31	1FM-31	Fixed Trimmer-Cer.

*Items 21A, 21B & 47 can be obtained as one unit under Part #21A473040.

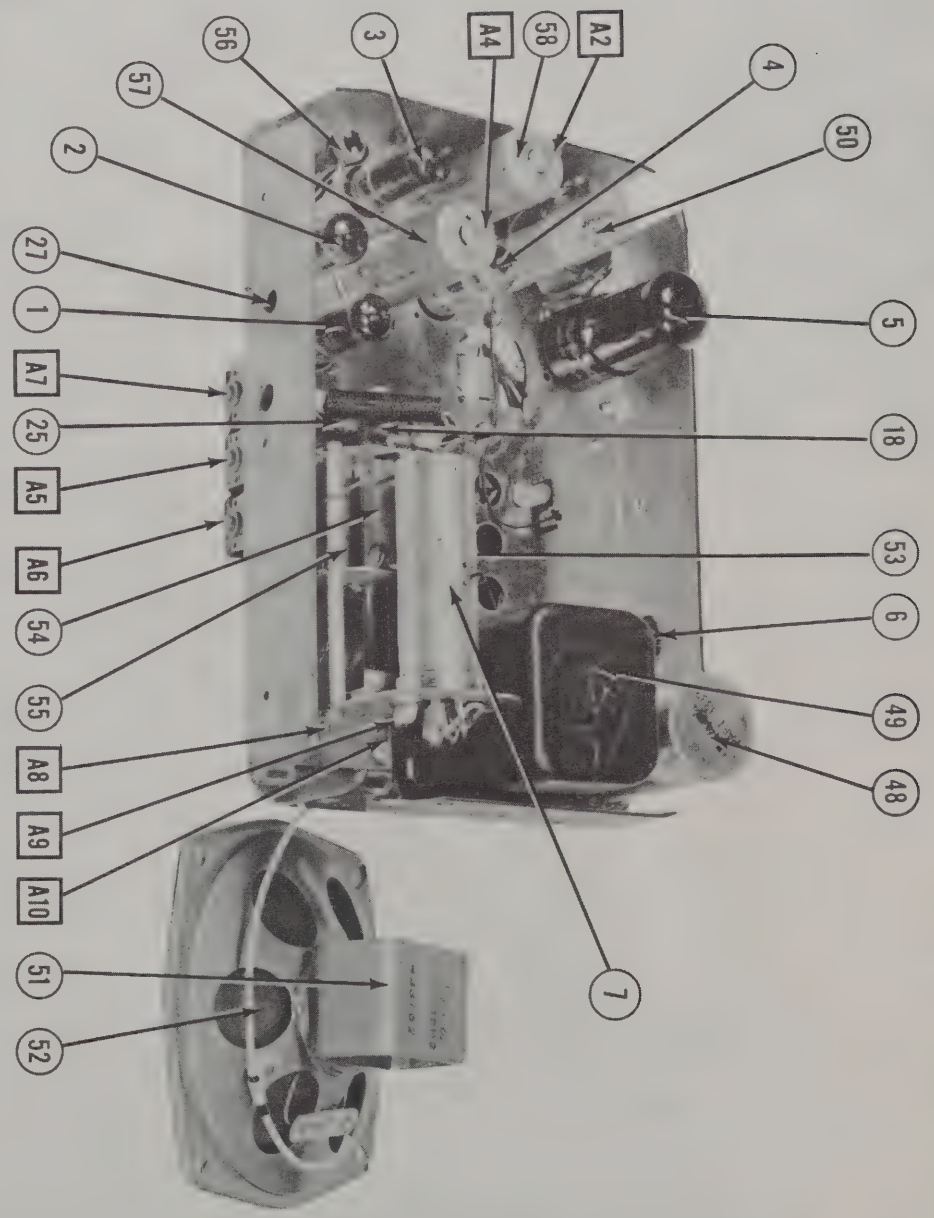
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
26A	500KΩ	½	18A480773	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 26A per instructions
C	Switch		" "	41	SW-A	" " " " "
27	700Ω	1	18K77552			Sensitivity Control

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	IDENTIFICATION CODES
28	470KΩ	½	6R6032	BTS-470K	Yl.-Vi.-Yl. RF Grid
29	150Ω	½	6R3992	BW-½-150	Br.-Grn.-Br. RF Cathode
30	100KΩ	½	6R6075	BTS-100K	Br.-Blk.-Yl. Converter Grid
31	47KΩ	½	6R6056	BTS-47K	Yl.-Vi.-Or. Oscillator Grid
32	10KΩ	2	6R476060	BT-2-10K	Br.-Blk.-Or. Screen Dropping
33	68KΩ	½	6R6001	BTS-68K	Blue-Gray-Or. Cathode Dropping
34	150Ω	½	6R3992	BW-½-150	Br.-Grn.-Br. IF Cathode
35	330Ω	½	6R6010	BW-½-330	Or.-Or.-Br. Decoupling
36	1 Meg.	½	6R6004	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
37	1 Meg.	½	6R6004	BTS-1 Meg.	Br.-Blk.-Grn. Diode Load
38	1500Ω	½	6R6161	BTS-1500	Br.-Grn.-Red AF Cathode
39	3.3 Meg.	½	6R2116	BTS-3.3 Meg	Or.-Or.-Grn. AF Grid
40	470KΩ	½	6R6032	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
41	220KΩ	½	6R6015	BTS-220K	Red-Red-Yl. Output Grid
42	270Ω	1	6R6336	BW-1-270	Red-Vi.-Br. Output Cathode
43	1000Ω	2	6R476004	BT-2-1000	Br.-Blk.-Red Filter

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MOTOROLA PART No.	IRC PART No.	
44	10KΩ	½	6R6054	BTS-10K	Br.-Blk.-Or. Hash Suppression
45	56Ω	½	6R5614	BW-½-56	Grn.-Blue-Blk. " "
46	56Ω	½	6R5614	BW-½-56	Grn.-Blue-Blk. " "
47	47KΩ	½	*	BTS-47K	Yl.-Vi.-Or. Diode RF Filter

*Items 47, 21A & 21B can be obtained as one unit under Part #21A473040.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA		INSTALLATION NOTES
				MOTOROLA PART No.	RADIART PART No.	
48	Interrupter	6.3	115∿	48B3333	5342M	

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	MOTOROLA PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
49	6V DC @ 4.0A	540V CT @ .06A			25B472533			

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MOTOROLA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
50	7000Ω	2.9Ω	365Ω	.6Ω	25B70171	A-3879	T22547	A-2931	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MOTOROLA PART No.	JENSEN PART No.	GUAM PART No.	
51A B	FIELD PM	VC IMP. 2.9Ω	50B76582 50B473955	ST-107 Mod. P5-V	52A15	Alternate speaker
52	CONE DIA. 5"	VC DIA. 1/2"				

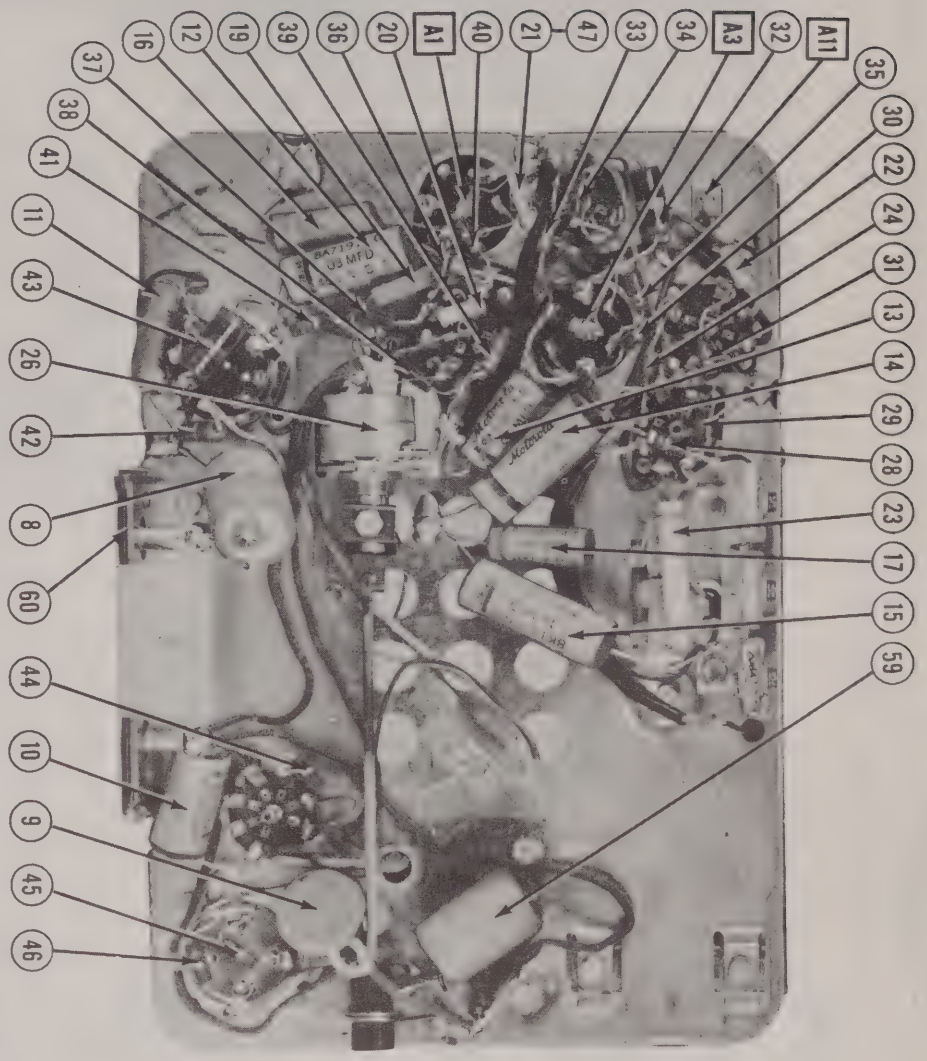
R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	
53	Ant. Coil		11Ω	24B71881		Items 53, 54 and 55 are slug tuned and part of tuner MT-59.
54	RF Coil		11Ω	24B71881		
55	Osc. Coil		2.8Ω	24B71879		
56	Osc. Pad. Coil		2.8Ω	24B70227		
57	Input IF	20Ω	20Ω	24B76553		
58	Output IF	20Ω	20Ω	24B76553		
59	Hash Choke		0Ω	24A472535		

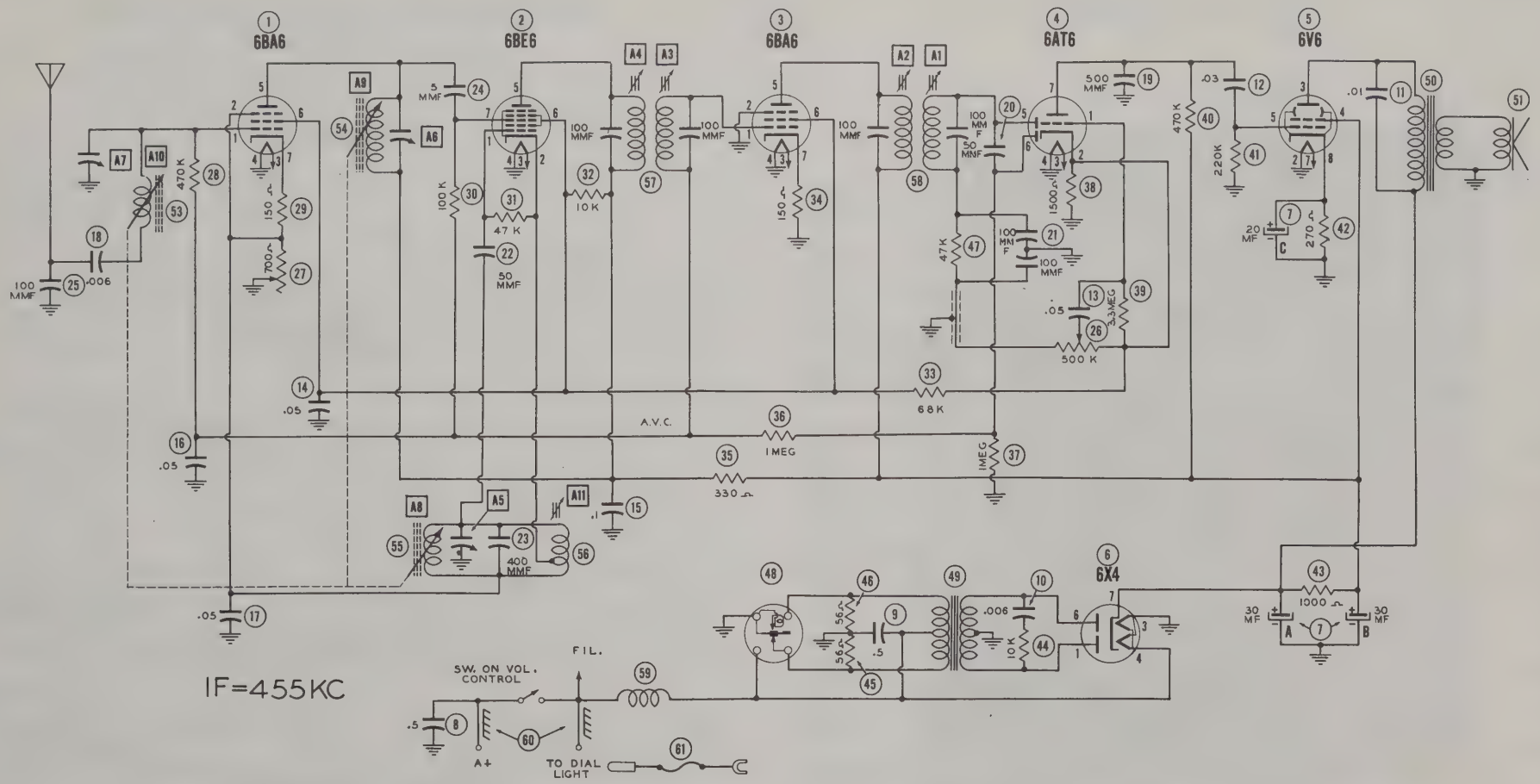
MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
60	Spark Plate	1X472741	
61	Fuse	65A10266	10 Amp.(3AG)
A5	Trimmer	20B472549	Osc. Adj.
A6	"	20B472549	RF Adj.
A7	"	20B472549	Ant. Adj.
	Manual Tuner	1X472702	(MT-59)

CHASSIS—BOTTOM VIEW



MOTOROLA MODEL 408



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	-.1VDC	0V.	6.3VDC	0V.	200VDC	77VDC	1VDC	-
2	6BE6	-4.5VDC§	0V.	6.3VDC	0V.	200VDC	77VDC	-.1VDC	-
3	6BA6	0V.	0V.	6.3VDC	0V.	205VDC	77VDC	1.4VDC	-
4	6AT6	.1VDC	2.3VDC	6.3VDC	0V.	0V.	.7VDC	67VDC	-
5	6V6GT	230VDC	0V.	215VDC	200VDC	0V.	0V.	6.3VDC	10VDC
6	6X4	270VAC	0V.	0V.	6VDC	250VAC	270VAC	230VDC	-

SENSITIVITY CONTROL AT MAXIMUM SENSITIVITY.
§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	2.5 Meg.	0Ω	.5Ω	0Ω	50KΩ	60KΩ	150Ω	-
2	6BE6	47KΩ	0Ω	.5Ω	0Ω	50KΩ	60KΩ	2.1 Meg.	-
3	6BA6	2 Meg.	0Ω	.5Ω	0Ω	50KΩ	60KΩ	150Ω	-
4	6AT6	3.3 Meg.	1.5KΩ	.5Ω	0Ω	1 Meg.	540KΩ	520KΩ	-
5	6V6	50KΩ	0Ω	50KΩ	50KΩ	220KΩ	INF.	.5Ω	270Ω
6	6X4	385Ω	INF.	0Ω	.5Ω	10KΩ	400Ω	50KΩ	-

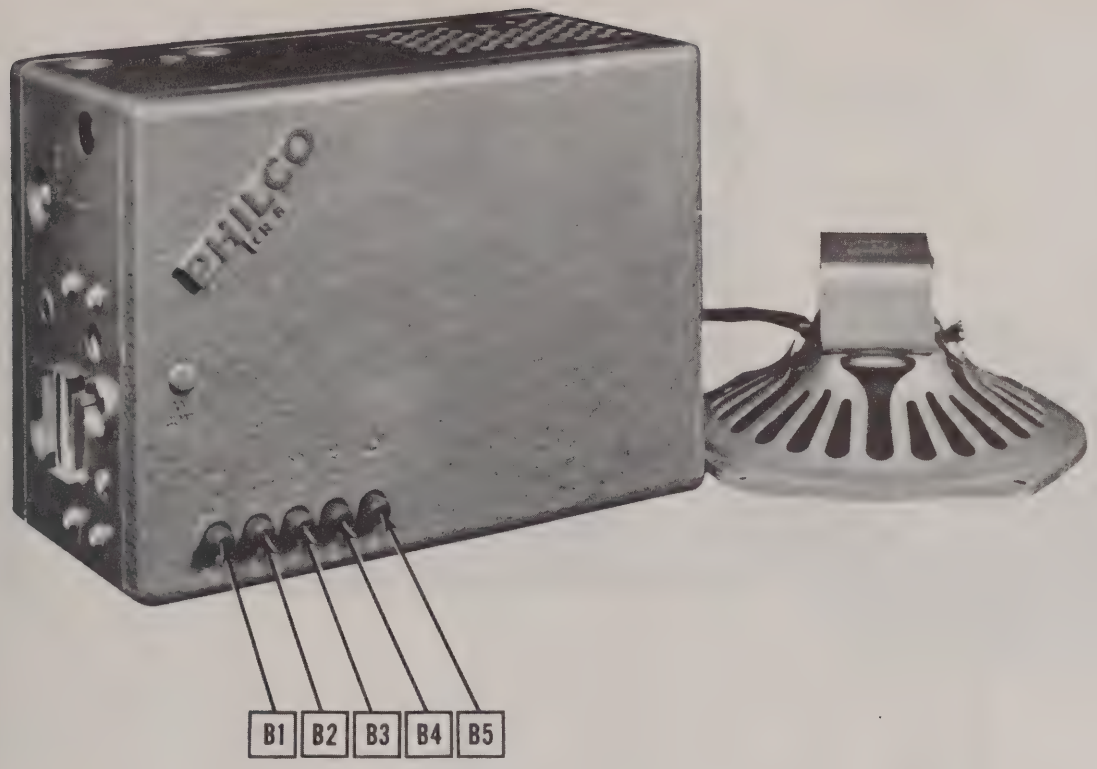
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1948

488-12

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volts.
2 - Socket connections are shown as bottom views.
3 - Battery voltage maintained at 6.3 volts for voltage readings.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.



PHILCO MODEL CR-8

TRADE NAME	Philco, Model CR-8
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	Battery Operated Universal Automotive Superheterodyne Receiver
TUBES (SIX)	Types, 6BA6 RF Amp., 6BE6 Converter, 6BA6 IF Amp., 6AV6 Det.-AVC-AF, 7C5 Power Output, 6X4 Rectifier.
POWER SUPPLY	6 Volt Storage Battery
TUNING RANGE—BROADCAST	535-1600KC RATING 7.5 Amp. @ 6.3 Volts DC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

With dial cable disengaged turn tuning slugs fully in turn dial cable till pointer is at extreme low freq. end of dial and re-engage cable.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to ant. receptacle. Low side to chassis.	455KC	Tuning slugs fully out.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output in order given.
2	.05 MFD	"	"	Depress any pushbutton other than manual.	"	A5	Adjust for minimum output.
3	2 30MMFD cap.	High side in series with one 30MMFD cap. to ant. receptacle. Connect the other 30MMFD from ant. receptacle to chassis. Low side of sig. gen. to chassis.	580KC	580KC (Depress dial button)	"	A6	Rock tuning control and adjust for maximum output.
4	"	"	1600KC	Tune for maximum output.	"	A7,A8	Adjust for maximum output.
5	"	"	1400KC	"			Reengage drive cable correct calibration. Adjust for maximum output. Repeat Steps 3, 4 and 5 until no further improvement can be made.

After receiver has been installed in car adjust A8 for maximum volume on weak station about 1400KC.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		PHILCO PART No.	STANDARD REPLACEMENT		
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6BE6	6BE6	7CH	
3	IF Amp.	6BA6	6BA6	7BK	
4	Det.-AVC-AF	6AV6	6AV6		
5	Power Output	7C5	7C5	6AA	
6	Rectifier	6X4	6X4	15BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
7A	15	350	61-0089		UP2235C	DY-310	EL-153	■ Filter
B	10	350						▲ "
C	20	25						Cathode Bypass
8	.0035	1600		1684-004	MD16D4	TM-16-004	TR-24	Buffer
9	.25	400	61-0125	484-.25	DT4P25	ST-4-25	TC-2	RF Bypass Pwr. Supply
10	.5	100	61-0137					Hash Filter
11	.5	100	61-0137					" "
12	.5	100	61-0137	484-.5	DT2P5	ST-2-5	TC-5	Contact Bypass
13	.006	1000	61-0105	1084-006	MD16D6	TM-16-006	TR-26	Output Plate Bypass
14	.01	600	61-0120	684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
15	.01	600	61-0120	684-01	DT6S1	ST-6-01	TC-11	Tone Comp.
16	.004	600	61-0178	684-004	DT6D4	ST-6-004	TC-24	Audio Coupling
17	.01	600	61-0120	684-01	DT6S1	ST-6-01	TC-11	Tone Comp.
18	.05	400	61-0122	484-05	DT4S5	ST-4-05	TC-15	Screen Bypass
19	.05	200	61-0122	484-05	DT2S5	ST-4-05	TC-15	IF Cathode Bypass
20	.05	200	61-0122	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
21	.05	200	61-0122	484-05	DT2S5	ST-4-05	TC-15	RF Cathode Bypass
22	330		62-133001001	1468-00035	5W5T4	MO.5-34	1FM-35	Hash Filter-Cer.
23	300		62-133001001	1468-00035	5W5T4	MO.5-34	1FM-35	" " "
24	100		30-1224-18	1468-00031	5W5T1	MO.5-31	1FM-31	AF Plate Bypass-Cer.
25	100		30-1224-18	1468-00031	5W5T1	MO.5-31	1FM-31	Diode RF Filter- "
26	100		30-1224-18	1468-00031	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.
27	380		61-0149					Fixed Trimmer
28	54.5		30-1220-37					" " -Cer.
29	180		60-10205307					Fixed Pad
30	180		60-10205307	1468-0002	5W5T2	MO.5-32	1FM-32	RF Coupling

CONTROLS

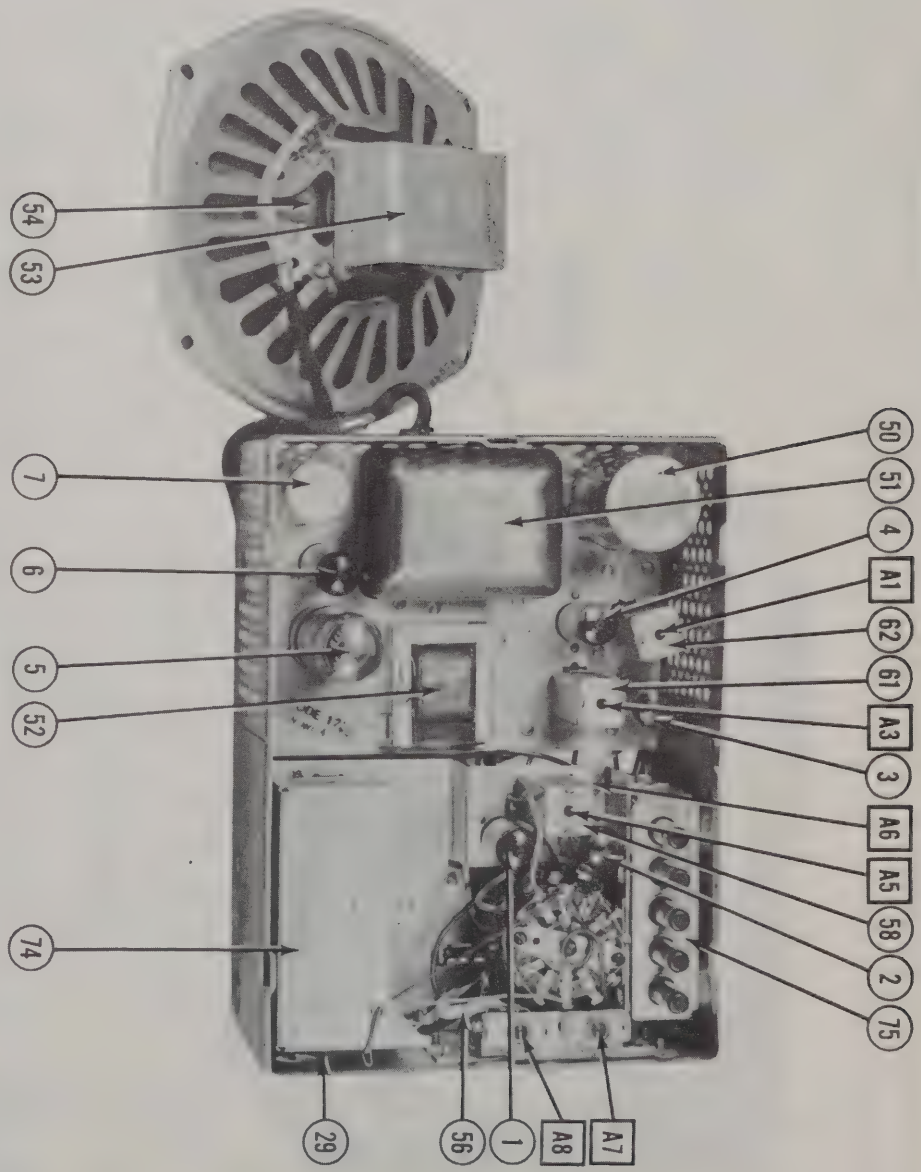
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	
31	350KΩ-5 Meg.	½	33-5557 or 33-5557-1*			Volume-Tone Controls and Switch-See Note

Note-Dual unit operated by concentric shafts.
*-Used in buick only.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	
32	220Ω	½	66-1223340	BW-½-220	Red-Red-Br. RF Cathode
33	220Ω	½	66-1223340	BW-½-220	Red-Red-Br. " "
34	10KΩ	½	66-3103340	BTS-10K	Br.-Blk.-Or. RF Plate Load
35	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Converter Grid
36	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
37	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or. Oscillator Grid
38	2200Ω	½	66-2223340	BTS-2200	Red-Red-Red IF Cathode
39	27KΩ	1	66-3274340	BTA-27K	Red-Vi.-Or. Screen Dropping
40	27KΩ	½	66-3273340	BTS-27K	Red-Vi.-Or. Diode RF Filter
41	10 Meg.	½	66-6103340	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
42	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. AF Plate Load
43	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. Output Grid
44	220Ω	1	66-1224340	BW-1-220	Red-Red-Br. Output Cathode
45	15KΩ	½	66-3153340	BTS-15K	Br.-Grn.-Or. Tone Compensator
46	4700Ω	½	66-2473340	BTS-4700	Yl.-Vi.-Red Filter
47	1000Ω	1	66-2104340	BTA-1000	Br.-Blk.-Red "
48	100Ω	1	66-1104340	BW-1-100	Br.-Blk.-Br. Hash Suppression
49	100Ω	1	66-1104340	BW-1-100	Br.-Blk.-Br. " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: RADIART PART No.	INSTALLATION NOTES
50	Interrupter	6.3	115~	45-6307	5326P	

TRANSFORMER (VIBRATOR)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
51	6.5V DC @ 4.1A	640V CT @ .06A			32-8315		T22R22	

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
52	3800Ω	3.8Ω	470Ω	.9Ω	32-8315	A-3856†	T22S46†	A-2902†	†Remove frame of original and use with replacement.

SPEAKER

ITEM No.	RATINGS	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD RES. / VC IMP.				
53A	4Ω	36-1609-3		7EV6	
B		36-1609-6			Alternate Speaker
	CONE DIA. / VC DIA.				
54	6-3/4" / 3/4"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: MEISSNER PART No.	
55	Ant. Coil		10Ω	65-0443-4		Part of Tuning Assembly
56	Ant. Choke Coil		7Ω	65-0437		
57	RF Coil		11Ω	65-0443-5		" " " "
58A	" "		24.5Ω	32-4162		
B	Trap Coil		22.5Ω			" " " "
59	Osc. Coil		9Ω	65-0443-6		
60	Osc. Shunt Coil		12Ω	32-4110		
61	Input IF	12Ω	12Ω	32-4160	16-6668	
62	Output IF	15Ω	15.5Ω	32-4161	16-6669	
63	RF Choke		.1Ω	65-0037		
64	" "		.1Ω	32-4170		
76	" "		.1Ω			

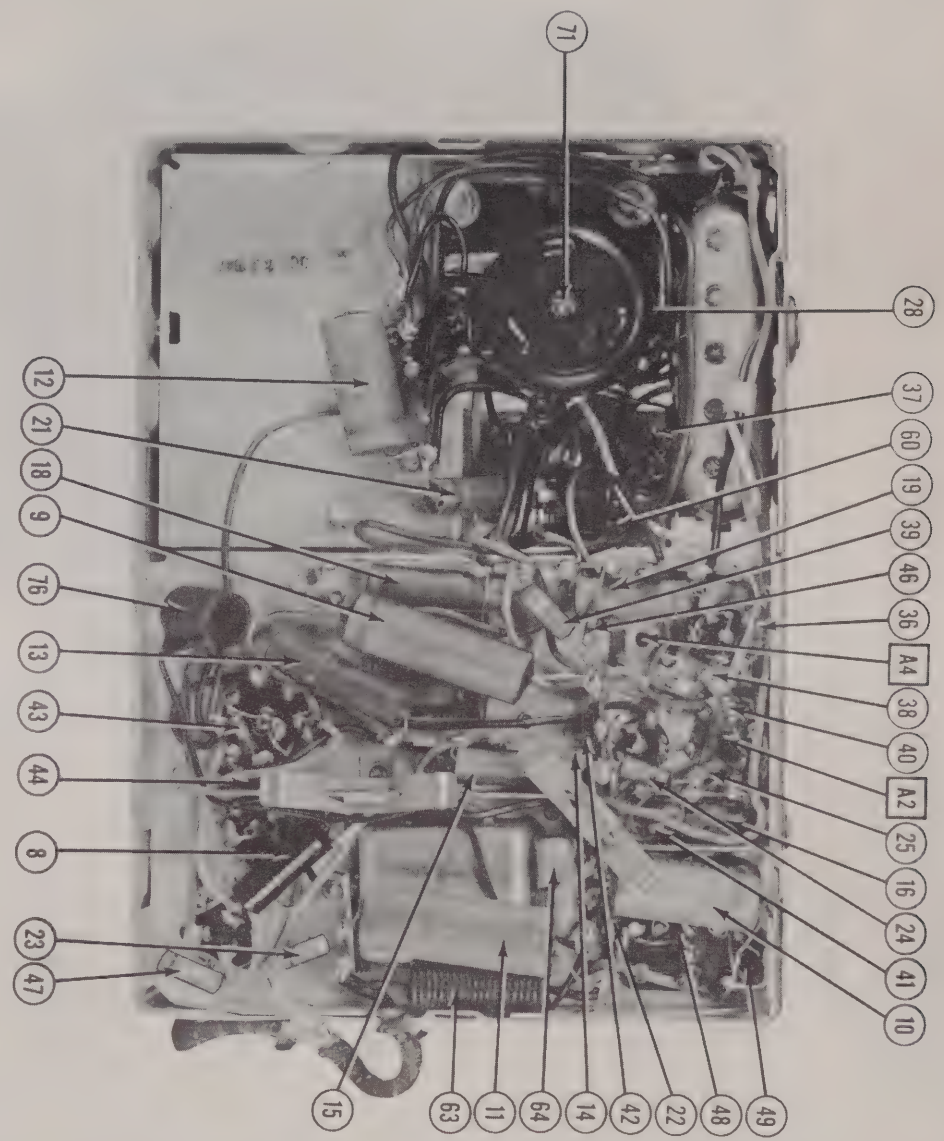
DIAL LIGHT

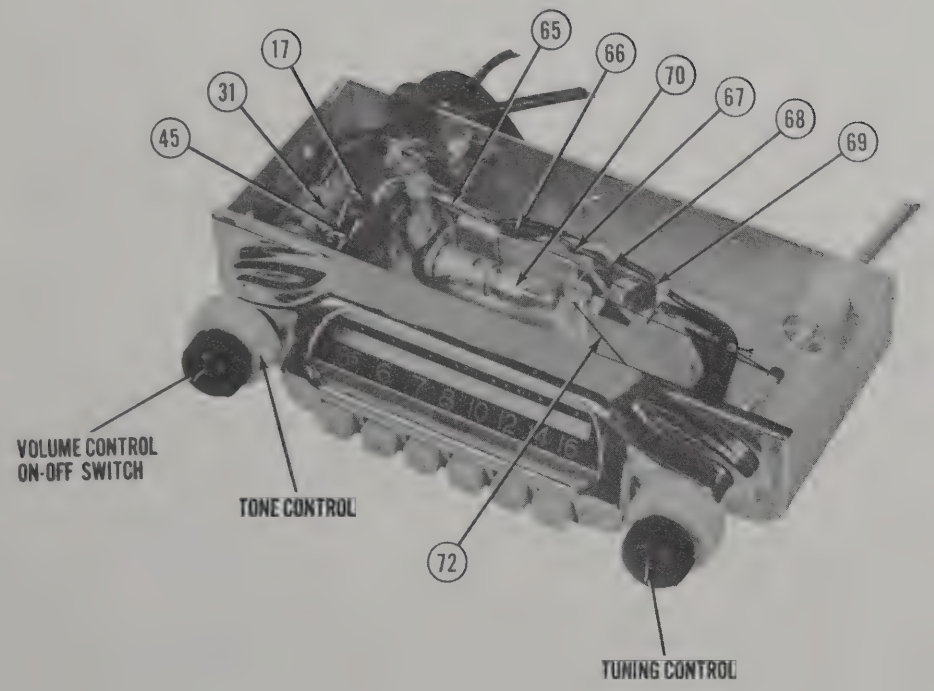
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA:	INSTALLATION NOTES
65-70	Bayonet	6-8	0.25	Blue	34-2040		Type 44

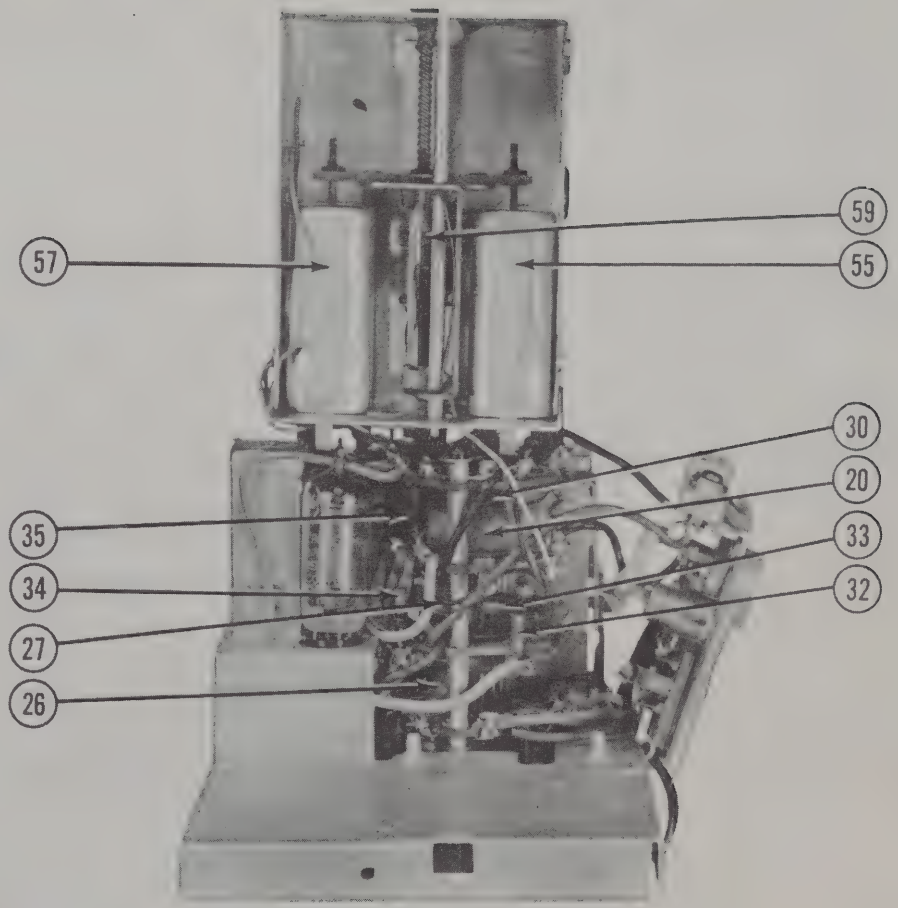
MISCELLANEOUS

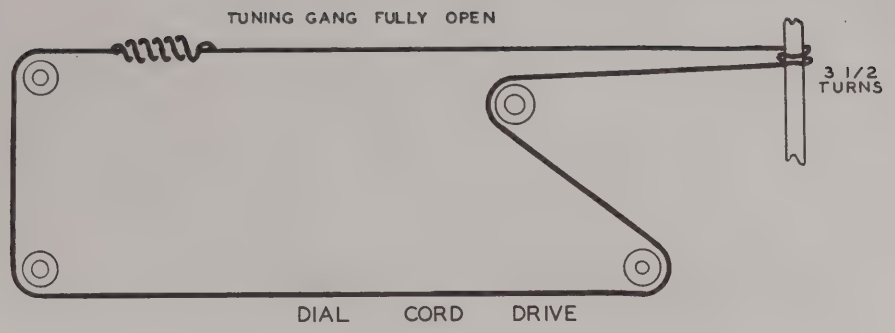
ITEM No.	PART NAME	PHILCO PART No.	NOTES
71	Assembly	76-2945	Solenoid and Wafer Switch
72	"	76-2957	Switch and Lamp-Housing
73	Fuse		SFE14
74	Assembly	76-2819	Manual Tuning
75	"	76-2715	Push-Button
A7	Trimmer	63-0055	RF Adj.
A8	"	63-0055	Ant. Adj.

CHASSIS—BOTTOM VIEW




17
65
66
70
67
68
69
31
45
72
VOLUME CONTROL
ON-OFF SWITCH
TONE CONTROL
TUNING CONTROL


59
57
55
30
20
35
33
34
32
27
26



PUSHBUTTON ADJUSTMENTS

Ranges of pushbuttons are: #1 - 540-1000KC, #2 - 650-1200KC, #3 - 700-1300KC, #4 - 750-1400KC and #5 - 850-1600KC.

Make a list of stations ranging from low to high frequency stations making certain that each station falls within range of its button.

1. Turn receiver on and allow it to warm up for at least 15 minutes.
2. Depress first pushbutton on left.
3. Adjust knob B_1 for maximum volume on desired station.
4. Depress second button from left and adjust knob B_2 for maximum volume on desired station.
5. Continue as above adjusting numbered buttons with corresponding numbered knobs for maximum volume on desired stations until all five buttons have been set up.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	-.4VDC	0V.	0V.	5.9VDC	200VDC	115VDC	1.6VDC	-
2	6BE6	-3VDC§	0V.	0V.	5.9VDC	215VDC	115VDC	-.45VDC	-
3	6BA6	0V.	0V.	0V.	5.9VDC	215VDC	115VDC	3.6VDC	-
4	6AV6	-.5VDC	0V.	0V.	5.9VDC	-.4VDC	-.4VDC	117VDC	-
5	7C5	0V.	220VDC	218VDC	235VDC	0V.	0V.	8.4VDC	5.9VDC
6	6X4	320VAC	0V.	0V.	5.9VDC	0V.	320VAC	235VDC	-

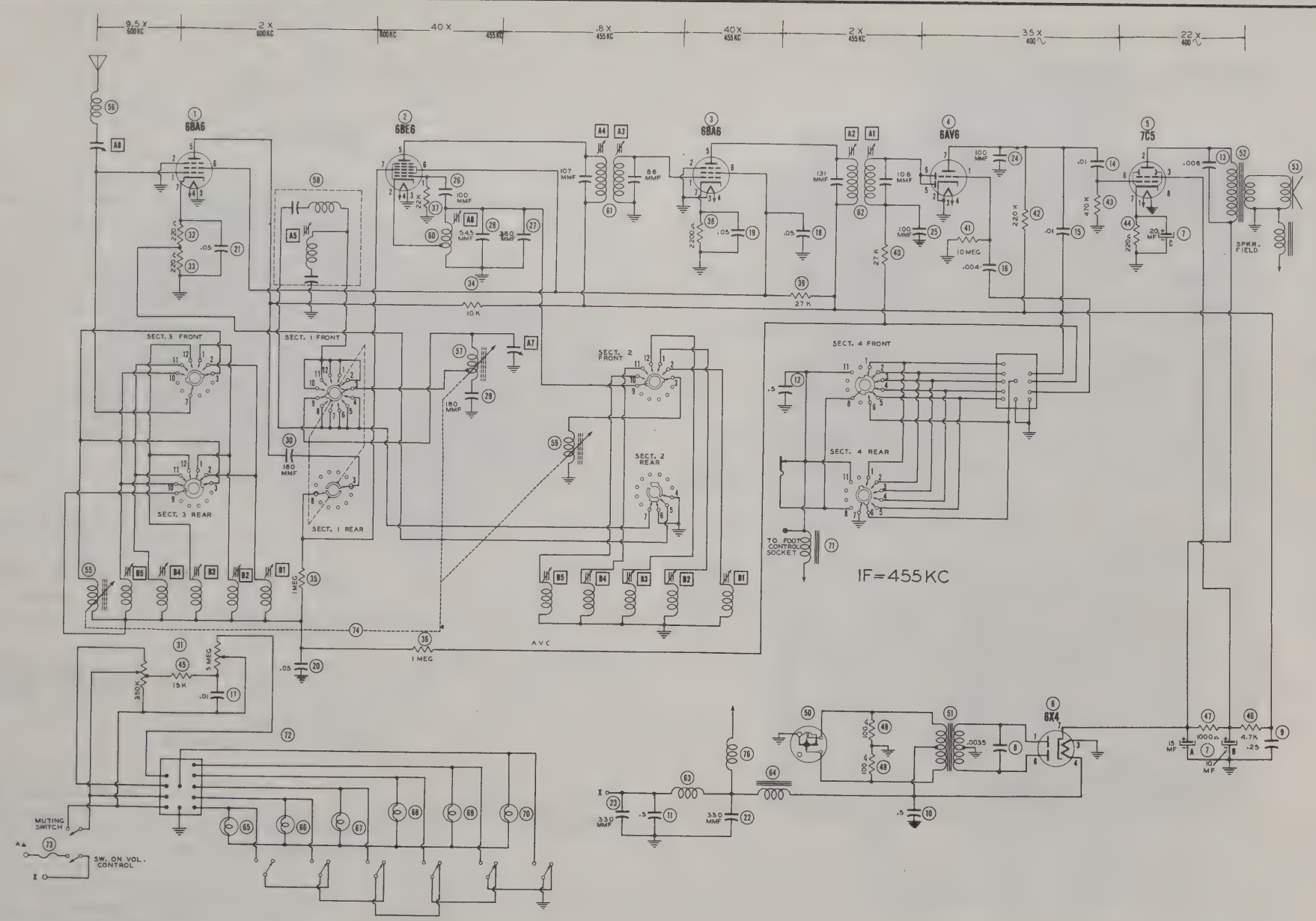
§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	1.3 Meg.	0Ω	0Ω	.1Ω	510KΩ	530KΩ	410Ω	-
2	6BE6	22KΩ	1Ω	0Ω	.1Ω	500KΩ	530KΩ	2.5 Meg.	-
3	6BA6	12Ω	0Ω	0Ω	.1Ω	500KΩ	530KΩ	2.2KΩ	-
4	6AV6	10 Meg.	0Ω	0Ω	.1Ω	350KΩ	350KΩ	720KΩ	-
5	7C5	0Ω	500KΩ	500KΩ	500KΩ	INF.	470KΩ	220Ω	.1Ω
6	6X4	360Ω	0Ω	0Ω	.1Ω	INF.	420Ω	500KΩ	-

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volts.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

DATE 4/48-#488-13 SET #33-FOLDER #13



A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1948

488-13

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

PHILCO MODEL 48-360

TRADE NAME	Philco, Model 48-360
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 1T4 RF Amp., 1R5 Converter, 1T4 IF Amp., 1U5 Det.-AVC-AF, 3LF4 Power Output, 117Z3 Rectifier.
POWER SUPPLY	105-120 Volts AC-DC or 9 Volts "A" Supply and 90 Volts "B" Supply in Pack Form.
RATING	.15 Amp. @ 117 Volts AC or 54MA @ 9 Volts DC and 15MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Align receiver with chassis mounted in the cabinet. To set pointer, turn variable fully closed and set pointer at the index mark at the low-frequency end of the dial. Use battery power for alignment whenever possible. If ac power is used use isolation transformer if available. If not, connect capacitor in series with the low side of the signal generator and chassis. Set volume control at maximum volume and keep output from the signal generator no higher than is necessary to obtain output reading. Use insulated alignment screwdriver for adjusting. Reconnect ext. ant. lead to chassis after alignment is completed.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	200MMF.	High side to ext. ant. lead. (Disconnect from chassis if connected). Low side to chassis.	265KC	Low freq. end of dial.	Across voice coil	A1,A2, A3,A4.	Preset A4 fully tight. Then adjust in order given including A4.
2	200MMF.	"	1600KC	1600KC	"	A5	Adjust for maximum output.
3	200MMF.	"	580KC	Tune for maximum output.	"	A6	Rock variable and adjust for maximum output.
4	200MMF.	"	1600KC	1600KC	"	A5	Adjust for maximum output.
5	200MMF.	"	1500KC	Tune for maximum output.	"	A7	" " " "
6	200MMF.	"	"	"	"	A8	" " " "

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 4/48-#48-14 SET #38-FOLDER #14

PARTS LIST AND DESCRIPTIONS

PHILCO MODEL 42-360

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	1T4	1T4	6AR	
2	Converter	1R5	1R5	7AT	
3	IF Amp.	1T4	1T4	6AR	
4	Det.-AVC-AF	1U5	1U5	6BW	
5	Power Output	3LF4	3LF4	6BB	
6	Rectifier	11Z3	11Z3	4BR	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	30	150	30-2560	PR5A40302	EZ443150	DY-303	TA-303	Filter - Or.
B	10	150						" - Brn.
C	30	150						" - Red
D	30	25		PFS150-12		M-30-150	UT-201	Filament Bypass-Yl.
8	.04	400	30-4118	484-05	DT4S4	ST-4-05	TC-14	Line Filter
9	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	RF Bypass Pwr. Supply
10	.004	600	61-0178	684-004	DT6D4	ST-6-004	TC-24	Output Plate Bypass
11	.004	600	61-0178	684-004	DT6D4	ST-6-004	TC-24	Audio Coupling
12	.05	200	61-0122	484-05	DT2S5	ST-4-05	TC-15	AF Screen Bypass
13	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
14	.1	400	61-0113	484-.1	DT4P1	ST-4-1	TC-1	Line Isolation
15	.05	200	61-0122	484-05	DT2S5	ST-4-05	TC-15	Screen Decoup.
16	.1	400	61-0113	484-.1	DT4P1	ST-4-1	TC-1	Filament Bypass
17	.05	200	61-0122	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
18	.25	100	61-0125		DT2P25	ST-2-25		Filament Bypass
19	.05	200	61-0122	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
20	.1	400	61-0113	484-.1	DT4P1	ST-4-1	TC-1	Filament Bypass
21	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	AVC Filter
22	.0015	600	45-3500-6	684-0015	DT6D2	ST-6-002	TC-22	Ext. Ant. Isolation
23	100	500	62-110009001	1468-0001	5W5T1	MO.5-31	1FM-31	Output Grid Bypass-Cer.
24	150	500	60-10155407	1469-00015	5R5T15	MOS.5-315		Fixed Pad.-Cer.
25	30	500	60-00305307		5R5Q3	MOS.5-43	MS-43	Fixed Trimmer
58	1.5	500	30-1221-3					Neutralizing Cap.-Cer.

CONTROLS

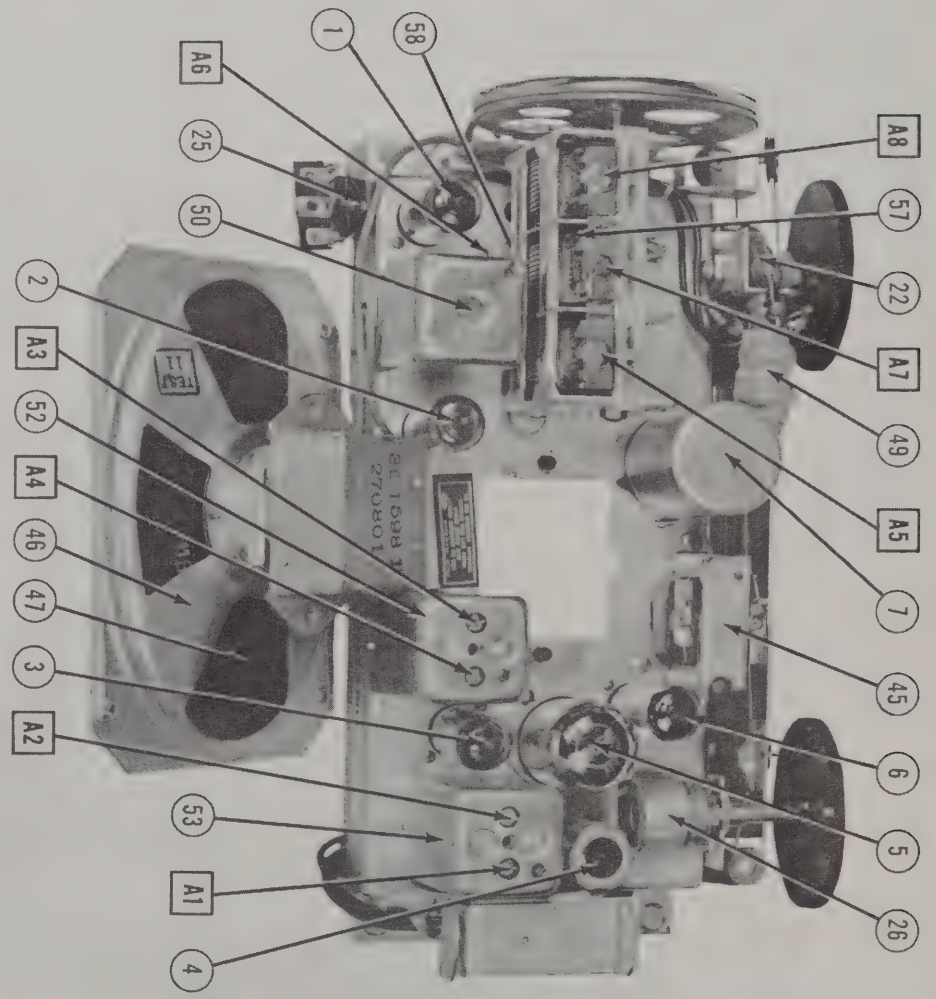
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
26	1 Meg.	½	33-5526			Volume Control & Sw.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
27	4.7 Meg.	½	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. AVC Network
28	4.7 Meg.	½	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. " "
29	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Oscillator Grid
30	10KΩ	½	66-3103340	BTS-10K	Br.-Blk.-Or. Voltage Dropping-See Note 1
31	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
32	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. Diode RF Filter
33	470Ω	½	66-1473340	BTS-470	Yl.-Vi.-Br. Filament String
34	270Ω	½	66-1273340	5W-½-270	Red-Vi.-Br. " "
35	4.7 Meg.	½	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Grid
36	10 Meg.	½	66-6103340	BTS-10 Meg.	Br.-Blk.-Blue AF Screen Dropping-See Note 2
37	1.2 Meg.	½	66-5123340	BTS-1.2 Meg.	Br.-Red-Grn. AF Plate Load
38	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. Output Grid-See Note 3
39	680Ω	½	66-1683340	BTS-680	Blue-Gray-Br. Filament String
40	2200Ω	½	66-2223340	BTS-2200	Red-Red-Red Filter
41	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Line Isolation
42	2200Ω	½	66-2223340	BTS-2200	Red-Red-Red Filament String-See Note 4
43	2200Ω	½	66-2223340	BTS-2200	Red-Red-Red " " " " "
44A	60Ω		33-3431-4		Surge Limiter
B	875Ω				Filament Dropping
C	875Ω				" "

Note 1-Some models use 15KΩ in this application. IRC replacement BTS-15K.
Note 2-Some models use 2.7 Meg. in this application. IRC replacement BTS-2.7 Meg.
Note 3-Some models use 2.2 Meg. in this application. IRC replacement BTS-2.2 Meg.
Note 4-Not used in all models.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		PHILCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
45	11000 Ω	3.3Ω	460Ω	.4Ω	328259	A-3879	T22847	A-2532	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.				
46	PM	3.3Ω	36-1598			
	CONE DIA.	VC DIA.				
47	4"x6"	1/2"	CONE HAS SPECIAL ADJUSTMENT FEATURE-ORDER FROM MANUFACTURER.			

R F COILS

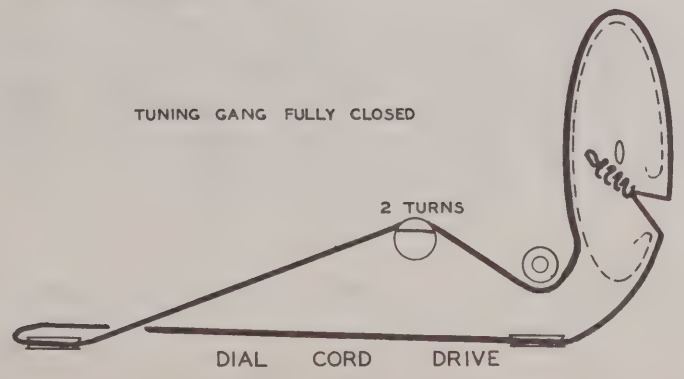
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.	
48	Loop Ant.		1.6Ω	32-4080		
49	Ant. Coil	34Ω	1Ω	32-3972	14-1056	
50A	RF Coil	82Ω	5Ω	32-3974		
B	" "			32-4210		Used in later production
51	Osc. Coil	1.8Ω	5.5Ω	32-4095-1	14-1060†	†Add 50MMFD from grid to high side tuning cap.
52	Input IF	41Ω	37Ω	32-3970	16-6658	
53	Output IF	38Ω-22Ω*		32-3971-2		*Feedback winding
54	RF Choke		12Ω	32-4007		

BATTERIES

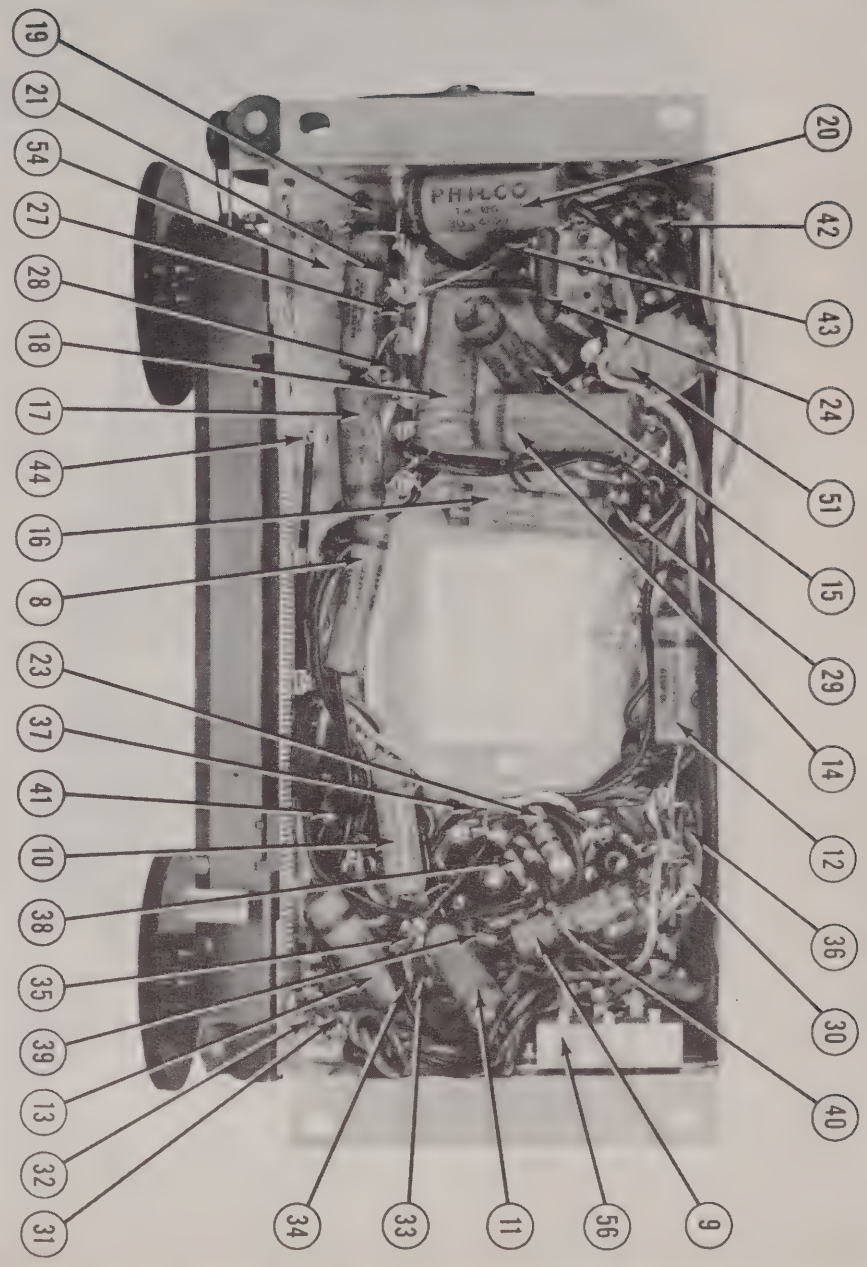
ITEM No.	VOLTAGE	PHILCO PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
55	9V "A" 90V "B"	P-841A			#753			F6A60	

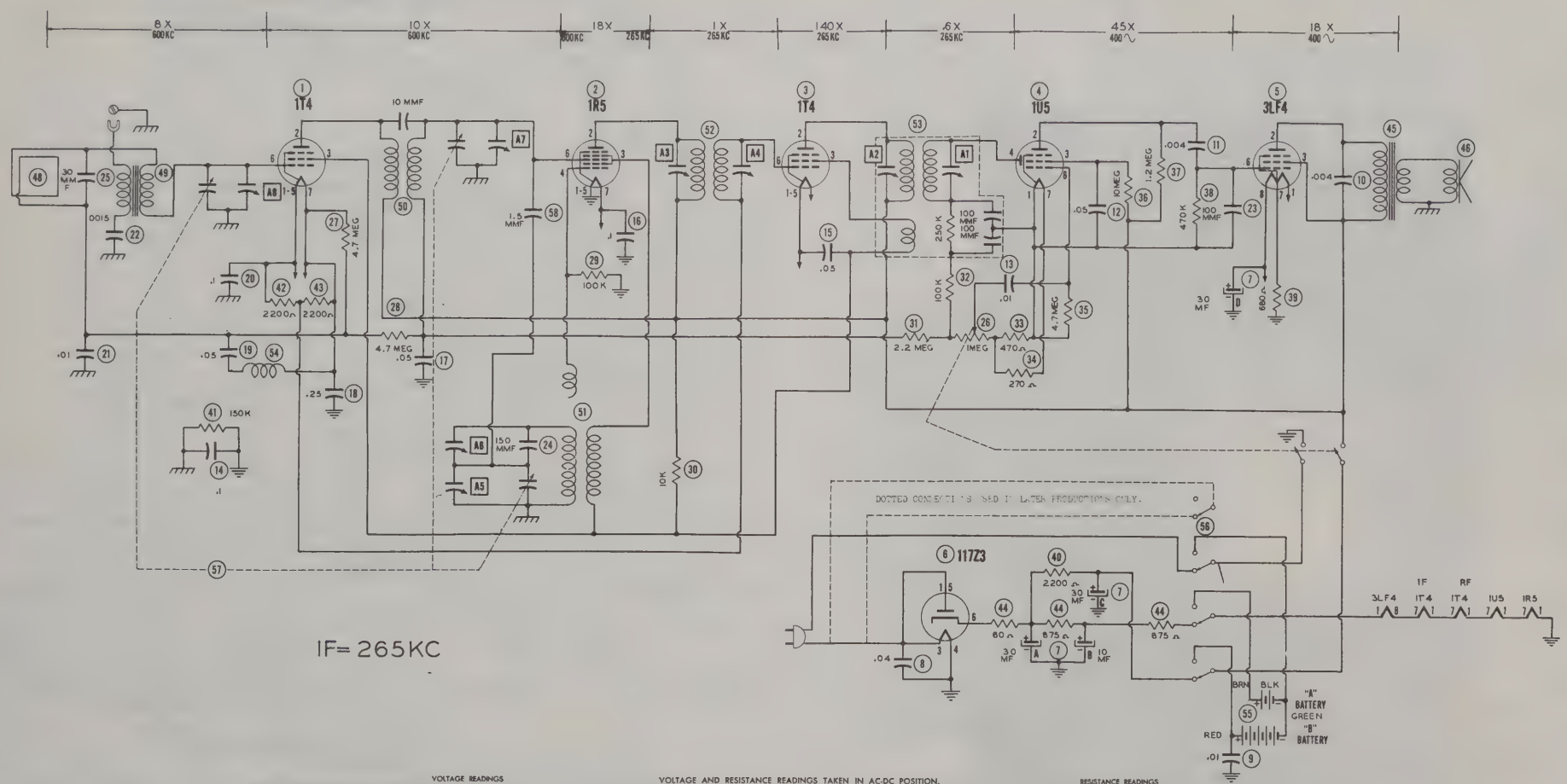
MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
56A	Switch	42-1553-1	AC-DC-Batt. (early production)
B	"	42-1821	" " (late production)
57	3 Gang Var. Cap.	31-2689	(25-425MMF) each section
A6	Padder	31-6410	Osc. Adj.
	Dial Scale	27-5891	
	Dial Pointer	76-2470	



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	1T4	3.1VDC	75VDC	50VDC	3.8VDC	3.1VDC	0V.	4.5VDC	-
2	1R5	0V.	75VDC	50VDC	-13VDC§	0V.	0V.	1.6VDC	-
3	1T4	4.5VDC	75VDC	50VDC	26VDC	4.5VDC	3.8VDC	5.9VDC	-
4	1U5	1.6VDC	19VDC	6.5VDC	12VDC	0V.	0V.	3.1VDC	-
5	3LF4	8.5VDC	74VDC	75VDC	1.6VDC	105VDC	.4VDC	7.1VDC	5.9VDC
6	11723	117VAC	0V.	117VAC	0V.	117VAC	110VDC	0V.	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	1T4	*	4KΩ	14KΩ	1KΩ	*	3 Meg.	*	-
2	1R5	*	4KΩ	14KΩ	100KΩ	*	2.5 Meg.	*	-
3	1T4	*	4KΩ	14KΩ	1.3 Meg.	*	1KΩ	*	-
4	1U5	*	1.2 Meg.	10 Meg.	1.3 Meg.	INF.	4.7 Meg.	*	-
5	3LF4	*	4KΩ	4KΩ	*	2KΩ	470KΩ	*	*
6	11723	450Ω	INF.	450Ω	0Ω	450Ω	2KΩ	INF.	-

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1948

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

488-14

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting across volume control.

1 - DC Voltage measurements are at 20,000 ohms per volts; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

PHILCO MODEL
48-461

PHILCO MODEL
48-461

PHILCO MODEL 48-461

TRADE NAME	Philco, Model 48-461
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 14AF7 Converter, 7B7 1st IF Amp., 7B7 2nd IF Amp., 7C6 Det.-AVC-AF, 50A5 Power Output, 35Y4 Rectifier.
POWER SUPPLY	105-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1620KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Turn tuning cap. fully closed and mark position of pointer. This mark is the calibration mark referred to below.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully closed	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output in order given and do not repeat. If isolation transformer is not used, reduce dummy antenna to .001 MFD. to reduce hum modulation.
2		Loop	1500KC	3-15/16" from calibration mark.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	"	Tune for maximum output.	"	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."

"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		PHILCO PART No.	STANDARD REPLACEMENT		
1	Converter	14AF7	14AF7	8AC	
2	1st IF Amp.	7B7	7B7	8V	
3	2nd IF Amp.	7B7	7B7	8V	
4	Det.-AVC-AF	7C6	7C6	8W	
5	Power Output	50A5	50A5	6AA	
6	Rectifier	35Y4	35Y4	5AL	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	PHILCO PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
7A	30	150	30-2575-10	TA-230	PRSA150-20-30	EZ42215	DSB-403020-150	Filter-Or.
B	25	150						" -Red
C	20	150		UT-301	PRS150-30			" -Blue
8	.04	400	45-3500-2	TC-14	484-04	DT4S4	ST-6-04	Line Filter
9	.02	400	61-0168	TC-12	484-02	DT4S2	ST-4-02	Output Plate Bypass
10	.01	400	61-0120	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
11	.01	400	61-0120	TC-11	484-01	DT4S1	ST-4-01	" "
12	.05	200	61-0122	TC-15	484-05	DT2S5	ST-4-05	Screen Bypass
13	.003	600	61-0109	TC-23	684-003	DT6D3	ST-6-003	Conv. Plate Decoup.
14	.05	200	61-0122	TC-15	484-05	DT4S5	ST-4-05	AVC Filter
15	.05	200	61-0122	TC-15	484-05	DT4S5	ST-4-05	Conv. Cathode Bypass
16	.04	400	45-3500-2	TC-14	484-04	DT4S4	ST-6-04	Tuning Cap. Isolation
17	.0015	600	45-3500-6	TC-22	684-0C2	DT6D2	ST-6-002	Ext. Ant. Isolation
18S	.2	400	76-1161					Line Isolation-See Note 1
19	220	500	30-1220-4	1FM-325	1468-00025	5W5T25	MO.5-325	Output Grid Bypass
20	220	500	30-1220-4	1FM-325	1468-00025	5W5T25	MO.5-325	IF Coupling
21	3	500	30-1221					Neutralizing Cap.-Note 2
22	500	500	60-10515307	1FM-35	1468-0005	5W5T5	MO.5-35	RF Coupling
23	220	500	30-1220-4	1FM-325	1468-00025	5W5T25	MO.5-325	Osc. Feedback
24	100	500	60-10105407	1FM-31	1468-0001	5W5T1	MO.5-31	Osc. Grid Cap.

Note 1-Special resonant capacitor.
Note 2-Used in early production.

CONTROLS

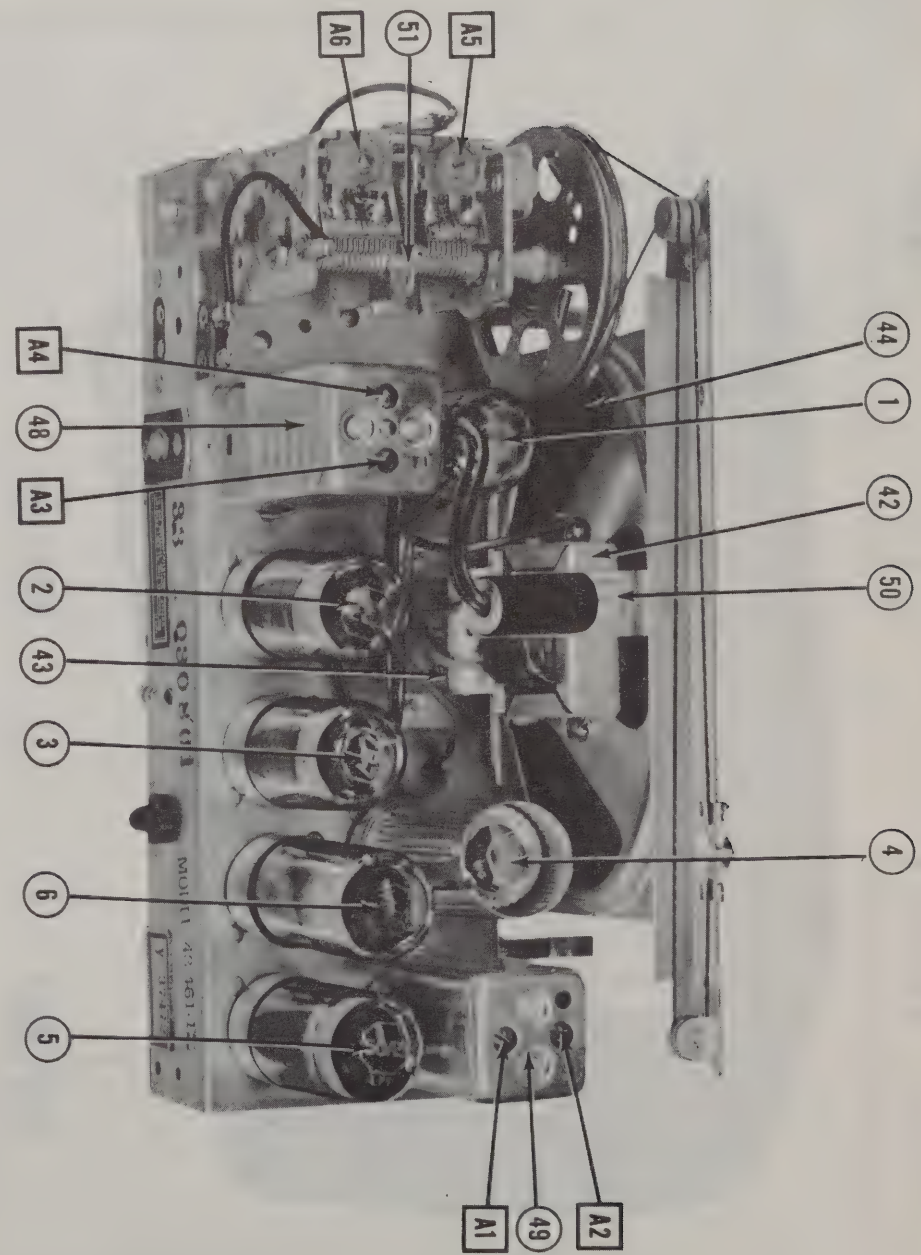
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	
25A	500KΩ	½	45-5007	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 25A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	
26	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Oscillator Grid
27	2200Ω	½	66-2223340	BTS-2200	Red-Red-Red Converter Cathode
28	10KΩ	½	66-3103340	BTS-10K	Br.-Blk.-Or. Oscillator Plate Load
29	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. Converter Grid
30	2200Ω	½	66-2223340	BTS-2200	Red-Red-Red Decoupling
31	15KΩ	½	66-3153340	BTS-15K	Br.-Grn.-Or. 1st IF Plate Load
32	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. 2nd IF Grid-See Note
33	33KΩ	½	66-3333340	BTS-33K	Or.-Or.-Or. Screen Dropping
34	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
35	3.3 Meg.	½	66-5333340	BTS-3.3 Meg.	Or.-Or.-Grn. AF Grid
36	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
37	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. Output Grid
38	130Ω	½	66-1133340	BW-½-130	Br.-Or.-Br. Output Cathode
39	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Line Isolation
40	1200Ω	½	66-2123340	BTS-1200	Br.-Red-Red Filter
41	220Ω	1	66-1224340	BW-1-220	Red-Red-Br. "

Note-Some models use 470KΩ in this application. Replacement same as #36.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
42	2000Ω	3.4Ω	180Ω	.7Ω	Part of 36-1615	A-3876†	T22845†	A-2928†	†Bend mounting tabs down, file out slots and mount on original bracket.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD RES.	VC IMP.				
43	PM	3.4Ω	36-1615			
	CONE DIA.	VC DIA.				
44	4"x6"	1/2"				

R F COILS

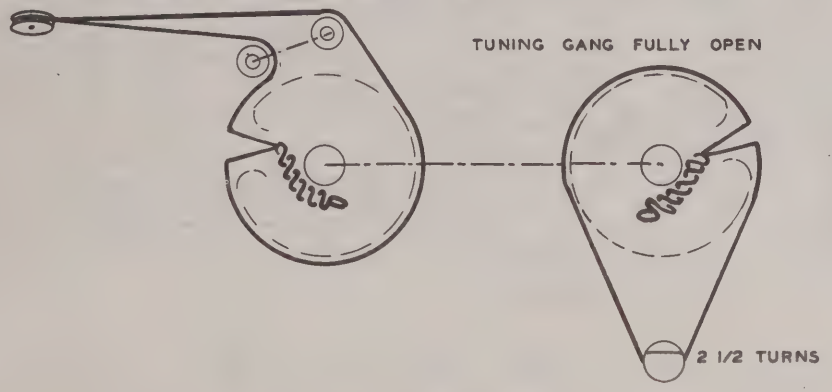
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.	
45	Loop Ant.	.3Ω	2.7Ω	32-4052-9		Some models use loop with primary winding and antenna coil (46) omitted.
46	Ant. Coil			32-4153		
47	Osc. Coil		6.8Ω	32-4153	14-1060	
48	Input IF	2.4Ω	11Ω	32-4151		
49	Output IF	25Ω		32-4152-1	16-6670	

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					PHILCO PART No.		
50	Bayonet	6-8	0.15	Brown	34-2068		Type 47

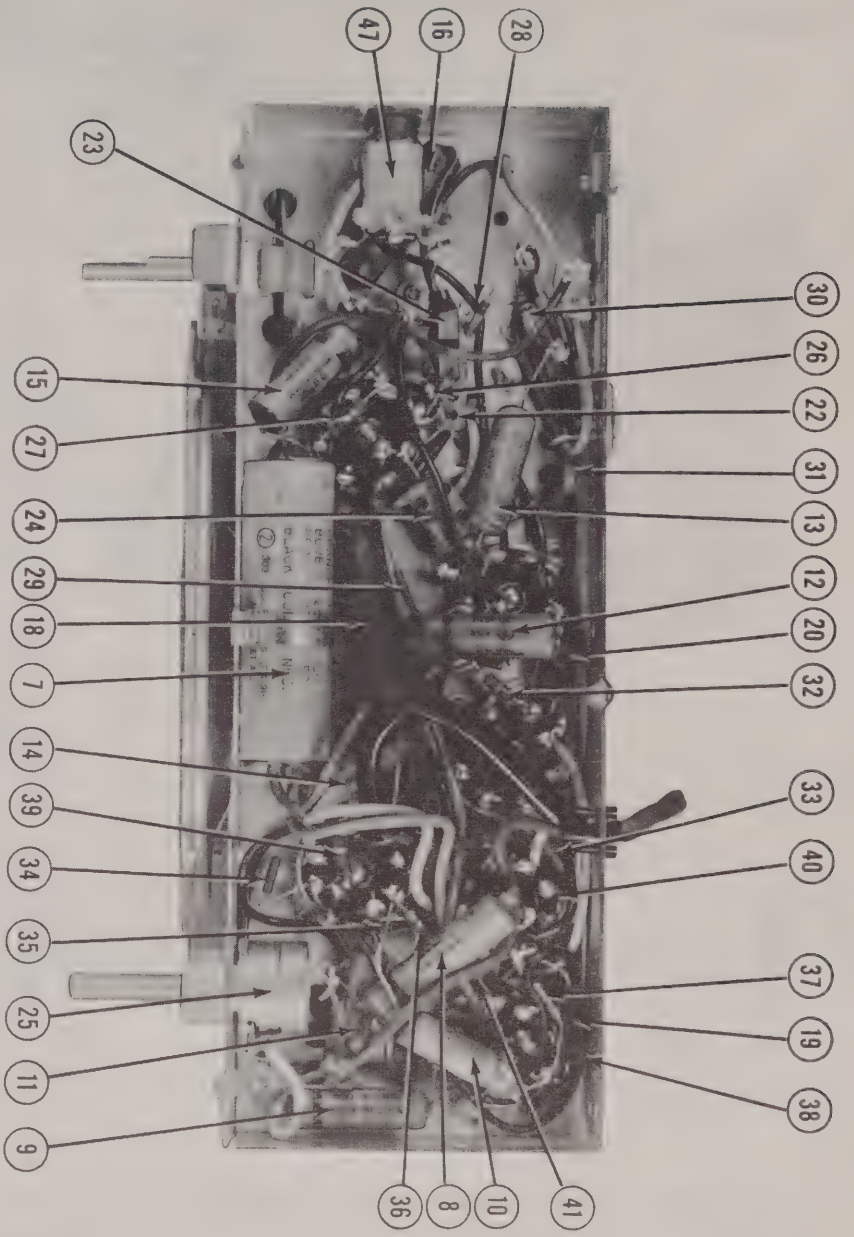
MISCELLANEOUS

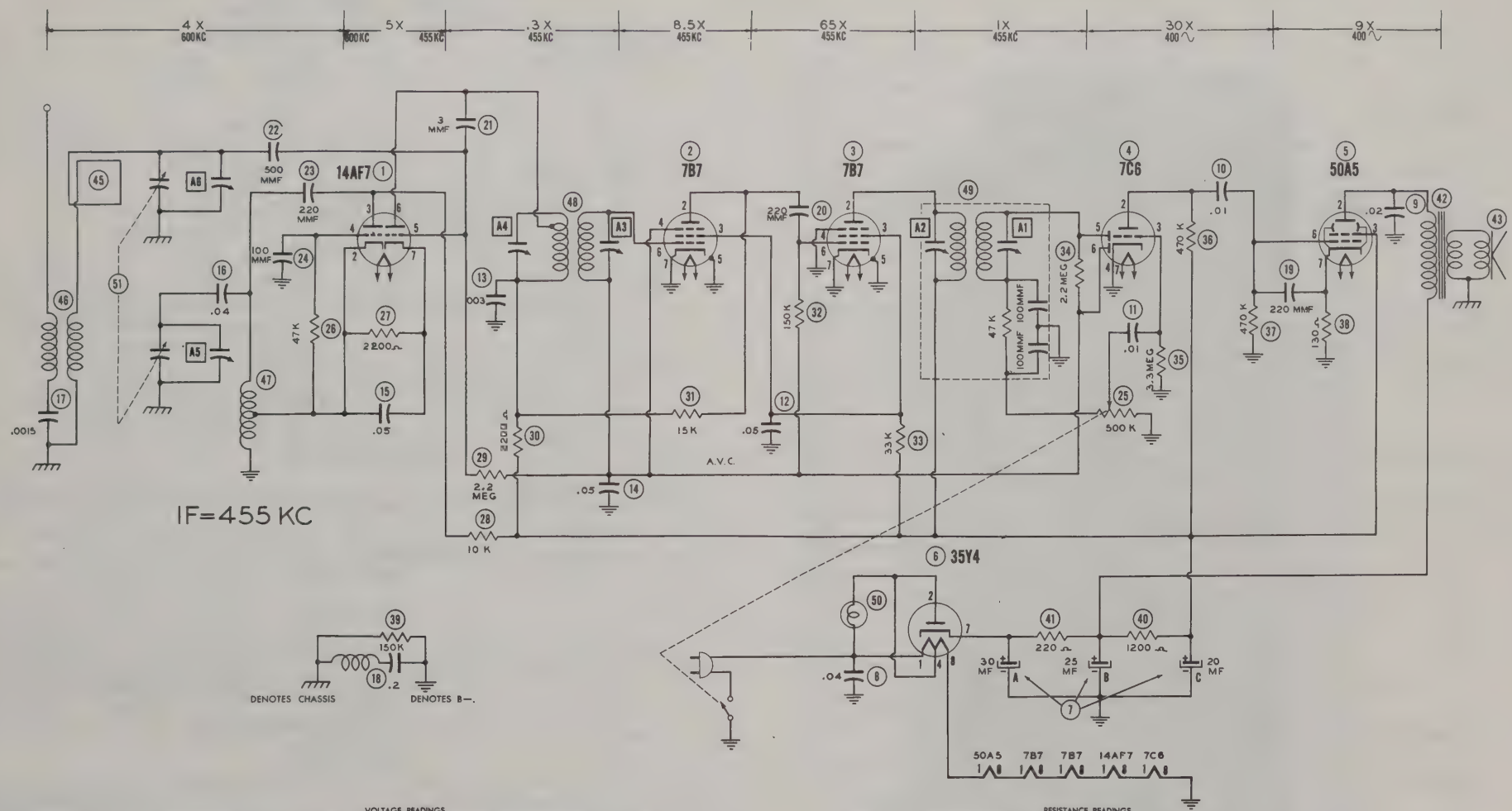
ITEM No.	PART NAME	PHILCO PART No.	NOTES
51	2 Gang Var. Cap.	31-2705-1	(29-496MMF, 27-174MMF)
	Dial Scale	27-5845	
	Knob	54-4228	
	Dial Pointer	56-2076-1	



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14AF7	20VAC	0V.	55VDC	-3VDC§	0V.	77VDC	4VDC	6.8VAC
2	7B7	27VAC	40VDC	40VDC	-.6VDC	0V.	-.6VDC	0V.	20VAC
3	7B7	35VAC	90VDC	100VDC	0V.	0V.	-.4VDC	0V.	27VAC
4	7C6	6.8VAC	60VDC	-.7VDC	0V.	-.2VDC	-.6VDC	0V.	0V.
5	50A5	85VAC	100VDC	92VDC	107VDC	0V.	0V.	5.2VDC	35VAC
6	35Y4	117VAC	114VAC	92VDC	114VAC	0V.	107VDC	120VDC	85VAC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14AF7	19Ω	2Ω	210KΩ	47KΩ	5 Meg.	200KΩ	2.2KΩ	7Ω
2	7B7	26Ω	215KΩ	230KΩ	3 Meg.	0Ω	3 Meg.	0Ω	19Ω
3	7B7	33Ω	200KΩ	230KΩ	0Ω	0Ω	3 Meg.	0Ω	26Ω
4	7C6	7Ω	670KΩ	3.3 Meg.	0Ω	500KΩ	3 Meg.	0Ω	0Ω
5	50A5	80Ω	200KΩ	200KΩ	200KΩ	INF.	470KΩ	130Ω	33Ω
6	35Y4	110Ω	105Ω	200KΩ	105Ω	0Ω	200KΩ	200KΩ	80Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1948

488-15

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHILHARMONIC
MODEL 100C

PHILHARMONIC
MODEL 100C

PHILHARMONIC MODEL 100C

TRADE NAME	Philharmonic, Model 100C
MANUFACTURER	Philharmonic Radio Corp., 528 E. 72nd St., New York, N.Y.
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (SEVEN)	Types, 6SA7GT Converter, 6SF7 IF Amp.-Det.-AVC, 6SL7GT AF-Phase Inv., (2) 25L6GT Power Output, (2) 25Z6GT Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—BROADCAST	540-1700KC RATING .5 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	200MMFD	High side to ext. ant. lug. Low side to chassis.	1700KC	"	"	A5	Adjust for maximum output.
3	200MMFD	"	1500KC	Tune for maximum output.	"	A6	" " " "

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove front wood screw of lid support slide so that lid may be lifted back.
3. Remove six Phillips head wood screws holding control panel to cabinet. Remove panel from cabinet.
4. Remove staples from loop antenna.
5. Disconnect phono-pickup plug.
6. Unsolder phono-motor leads.
7. Unsolder leads from speaker.
8. Remove four screws holding chassis in cabinet. Remove chassis and loop from cabinet.
9. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

PHILHARMONIC MODEL 100C

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILHARMONIC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter		6SA7GT	8AD	
2	IF Amp.-Det.-AVC		6SF7	7AZ	
3	AF-Phase Inv.		6SL7GT	8BD	
4	Power Output		25L6GT	7AC	
5	" "		25L6GT	7AC	
6	Rectifier		25Z6GT	7Q	
7	"		25Z6GT	7Q	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILHARMONIC PART No.	REPLACEMENT DATA: SPRAGUE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	40	150		TA-440	PRS150-40-40	EDL4415	DSB-2x40-150	Filter-Blue
B	40	150						" -Red
C	40	150		TA-240	PRSA150-20-40	EDL4215	DSB-2x40-150	" -Yellow
D	10	150						" -Green
9	.02	400		TC-12	484-02	DT4S2	ST-4-02	Audio Coupling
10	.02	400		TC-12	484-02	DT4S2	ST-4-02	" "
11	.02	400		TC-12	484-02	DT4S2	ST-4-02	" "
12	.2	200		TC-2	484-.2	DT4P2	ST-4-2	Phono Isolation
13	.002	600		TC-22	684-001	DT6D2	ST-6-002	Tone Compensation
14	.2	200		TC-2	484-.2	DT4P2	ST-4-2	RF Bypass Pwr. Supply
15	.05	200		TC-15	484-05	DT4S5	ST-4-05	AVC Filter
16	.2	200		TC-2	484-.2	DT4P2	ST-4-2	Line Isolation
17	.001	600		TC-21	684-001	DT6D1	ST-6-001	Ant. Isolation
18	220	500		1FM-32	1468-0002	5W5T2	MO.5-32	AF Plate Bypass
19	100	500		1FM-31	1468-0001	5W5T1	MO.5-31	Diode Filter
20	100	500		1FM-31	1468-0001	5W5T1	MO.5-31	" "
21	22	500		MS-42	1468-000025	5W5Q25	MO.5-425	Osc. Grid Cap.
50	.05	200		TC-15	484-05	DT4S5	ST-4-05	Line Filter

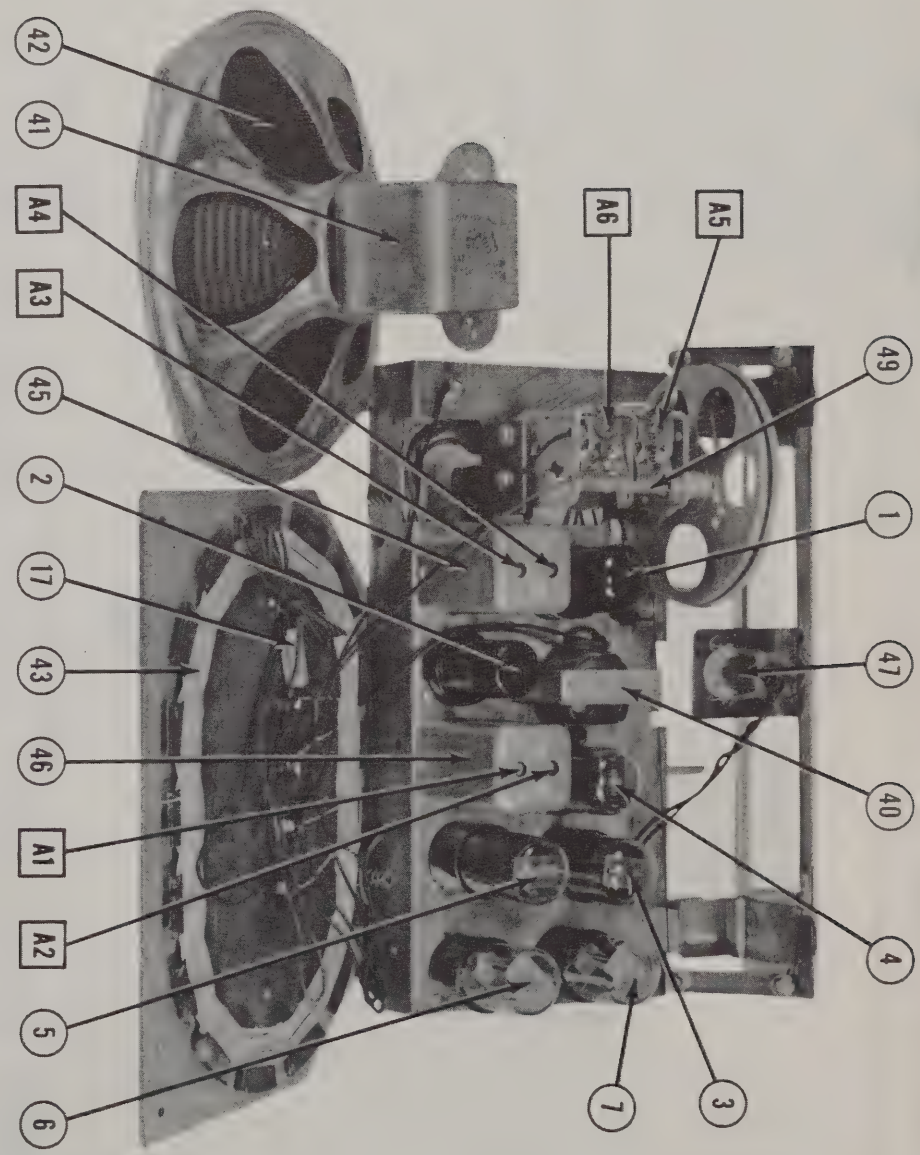
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILHARMONIC PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
22A	500KΩ	½		D13-133	M-60-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 22A per instructions
C	Switch			41	SW-A	" " " " "
23A	500KΩ	½		D13-133	M-60-Z	Tone Control
B	Shaft			A	Not Req.	Attach to 23A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILHARMONIC PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
24	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
25	220KΩ	½		BTS-220K	Red-Red-Yl. Line Isolation
26	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
27	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Diode RF Filter
28	33Ω	½		BW-½-33	Or.-Or.-Blk. Feedback
29	100Ω	½		BW-½-100	Br.-Blk.-Br. "
30	2200Ω	½		BTS-2200	Red-Red-Red AF Cathode
31	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AF Grid
32	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AF Plate Load
33	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Phase Inverter Plate Load
34	18KΩ	½		BTS-18K	Br.-Gray-Or. Phase Inverter Grid
35	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
36	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. " "
37	82Ω	1		BW-1-82	Gray-Red-Blk. Output Cathode
38	1500Ω	½		BTS-1500	Br.-Grn.-Red Filter
39	1500Ω	1		BTA-1500	Br.-Grn.-Red "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		PHILHARMONIC PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
40	5200Ω CT	3.3Ω	250Ω CT	.8Ω		A-3852	T22S58*	A-2901	*Drill new mounting holes.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			PHILHARMONIC PART No.	JENSEN PART No.	QUAM PART No.	
41	FIELD RES. PM	VC IMP. 3.3Ω		ST-117 Mod. P8-T	8A31	
42	CONE DIA. 7-3/8"	VC DIA. 1"				

R F COILS

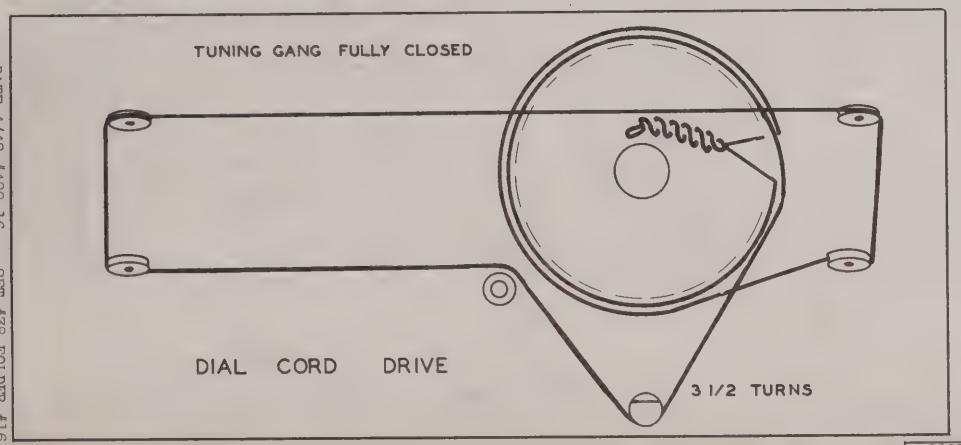
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	PHILHARMONIC PART No.	MEISSNER PART No.	
43	Loop Ant.	.2Ω	1Ω			
44	Osc. Coil		9Ω		14-1060	
45	Input IF	14Ω	14Ω	SLR-127	16-6658	
46	Output IF	9Ω	9Ω	SLR-128		

DIAL LIGHT

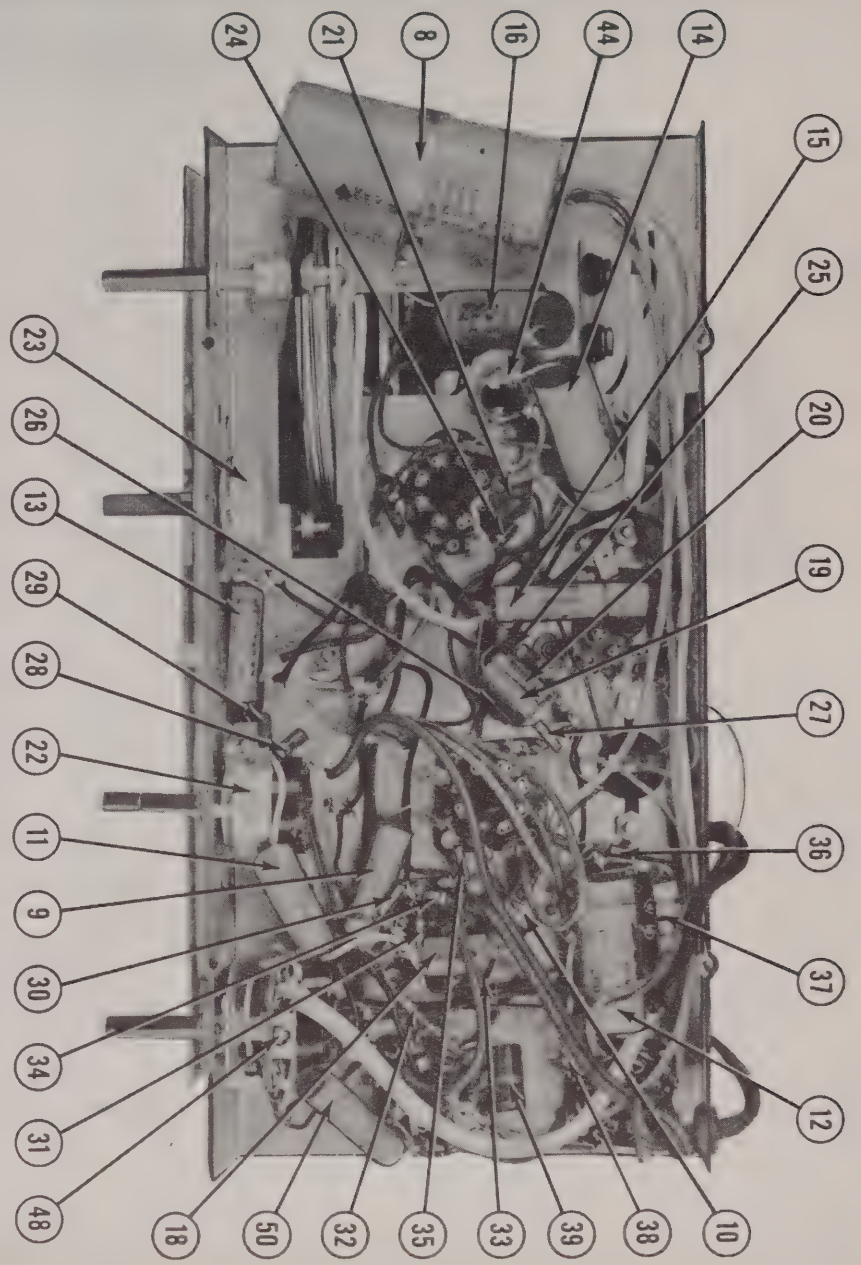
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					PHILHARMONIC PART No.		
47	Screw	120					3 Watt

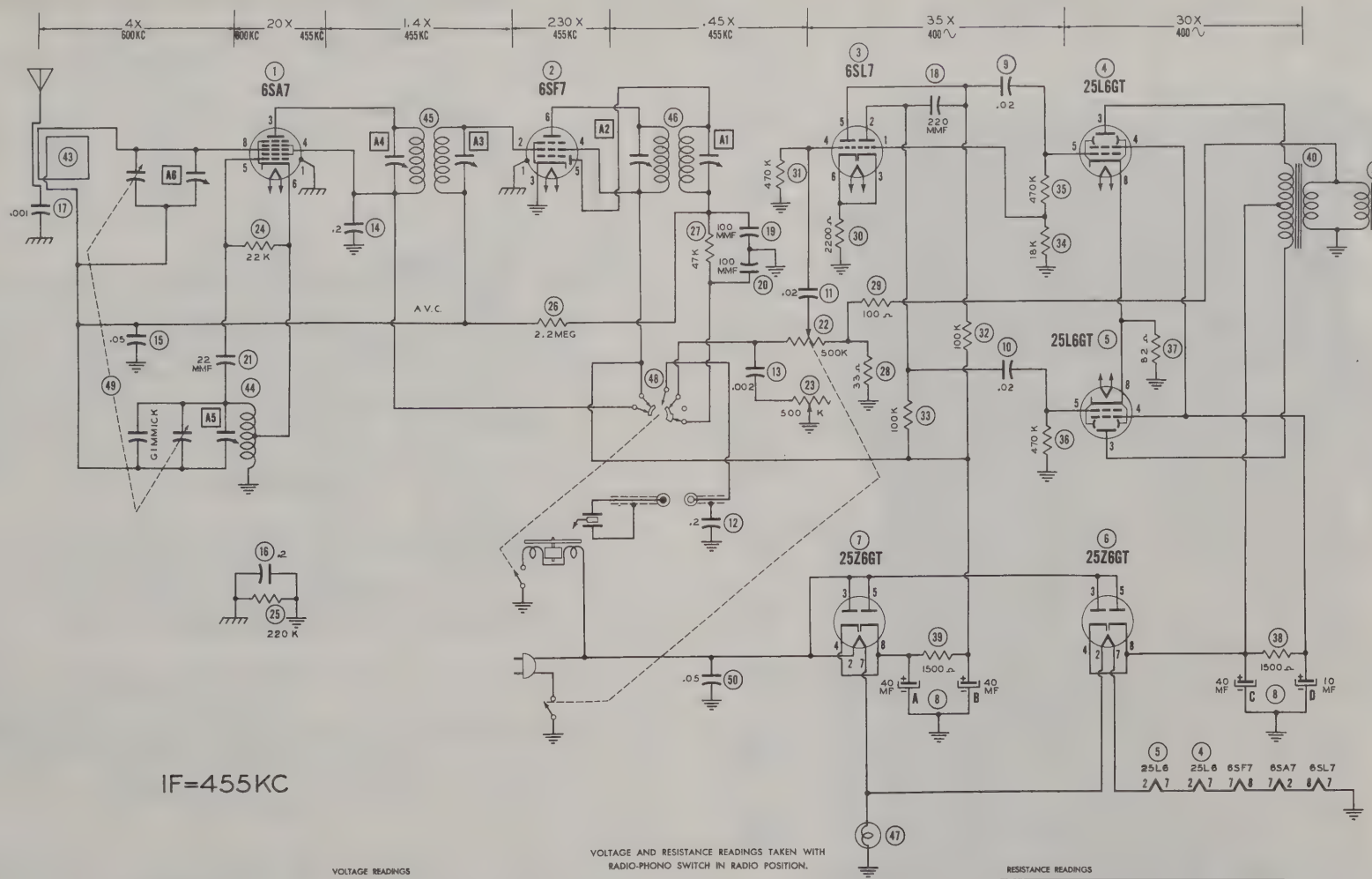
MISCELLANEOUS

ITEM No.	PART NAME	PHILHARMONIC PART No.	NOTES
48	Switch		Radio-Phono
49	2 Gang Var. Cap.		(23-463MMF, 36-199MMF)



CHASSIS—BOTTOM VIEW





VOLTAGE AND RESISTANCE READINGS TAKEN WITH RADIO-PHONO SWITCH IN RADIO POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SA7	0V.	6VAC	100VDC	100VDC	-14VDC§	0V.	11VAC	-.5VDC
2	6SF7	0V.	-.5VDC	0V.	100VDC	-.6VDC	100VDC	17VAC	11VAC
3	6SL6	0V.	77VDC	1VDC	0V.	72VDC	1VDC	0V.	6VAC
4	25L6	0V.	41VAC	122VDC	117VDC	0V.	0V.	17VAC	7.6VDC
5	25L6	0V.	66VAC	125VDC	117VDC	0V.	0V.	41VAC	7.6VDC
6	25Z6	0V.	89VAC	117VAC	124VDC	117VAC	0V.	66VAC	124VDC
7	25Z6	0V.	117VAC	117VAC	147VDC	117VAC	116VDC	89VAC	147VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SA7	220KΩ	3Ω	100KΩ	100KΩ	22KΩ	1Ω	7Ω	2.8 Meg.
2	6SF7	220KΩ	2.8 Meg.	0Ω	100KΩ	550KΩ	10KΩ	1Ω	7Ω
3	6SL7	18KΩ	200KΩ	2.2KΩ	470KΩ	220KΩ	2.2KΩ	0Ω	3Ω
4	25L6	INF.	26Ω	100KΩ	100KΩ	490KΩ	INF.	1Ω	82Ω
5	25L6	INF.	41Ω	100KΩ	100KΩ	470KΩ	0Ω	26Ω	82Ω
6	25Z5	INF.	56Ω	75Ω	100KΩ	75Ω	INF.	41Ω	100KΩ
7	25Z5	INF.	75Ω	75Ω	100KΩ	75Ω	100KΩ	56Ω	100K.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

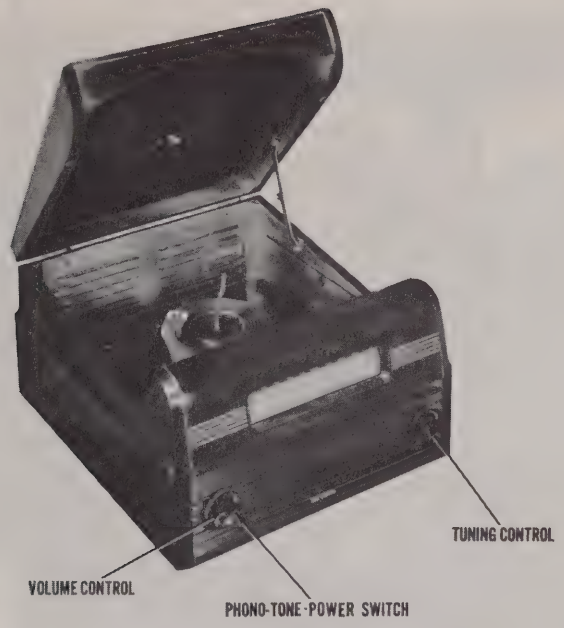
© Howard W. Sams & Co., Inc. 1948

488-16

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RCA (VICTOR) MODEL
77U (Ch. RC-1057A)



RCA (VICTOR) MODEL 77U

TRADE NAME	RCA (Victor), Model 77U (Ch. RC-1057A)
MANUFACTURER	RCA Victor Div., Radio Corp. of America, Camden, N.J.
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12SA7 Converter, 12SK7 IF Amp., 6AQ6 Det.-AVC-Phase Inv., 6C4 AF Amp., (2) 35L6GT Power Output.
POWER SUPPLY	105-125 Volts AC
TUNING RANGE—BROADCAST	540-1600KC RATING .31 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer with receiver out of cabinet turn tuning cap. fully closed and set pointer 3-7/8" from left edge of dial backplate.
Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to Pin 4 (grid) 12SK7. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	.01 MFD	High side to rear stator of tuning cap. Low side to B-.	"	"	"	A3,A4.	Adjust for maximum output. Install receiver and record changer in cabinet.
3	220MMFD	High side to ext. ant. lead. Low side to terminal adjacent to ext. ant. terminal.	1600KC	9-3/4" from left edge of dial backplate.	"	A5	Adjust for maximum output.
4	220MMFD	"	1400KC	Tune for maximum output.	"	A6	" " " "
5	220MMFD	"	600KC	"	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 3, 4 and 5 until no further improvement can be made.

CRITICAL LEAD DRESS

1. Dress output plate bypasses and leads as near chassis as possible.
2. Dress all filament leads down to chassis.
3. Dress resistor (33) away from shield.
4. Dress resistor (27) away from resistors (42 & 43).
5. Dress resistor (44) away from resistor (39).
6. Dress resistors (40 & 36) away from 6AQ6 socket.
7. Dress high side of line cord down to front apron.
8. Dress lead of capacitor (20) which connects to phono input away from side of chassis.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

RCA (VICTOR)
MODEL 77U

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RCA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-Phase-Inv.	6AQ6	6AQ6	7BT	
4	AF Amp.	6C4	6C4	6BG	
5	Power Output	35L6GT	35L6GT	7AC	
6	" "	35L6GT	35L6GT	7AC	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RCA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	80	150	73013	AF444D *	UP84215	DY-804020-150	EL-340*	■ Filter
B	30	150						▲ "
C	10	150		PRSA150-40-40			UT-501	"
8	.025	400	70612	484-025	DT4S25	ST-6-02	TC-13	Line Filter
9	.02	400	71928	484-02	DT4S2	ST-4-02	TC-12	Output Plate Bypass
10	.02	400	71928	484-02	DT4S2	ST-4-02	TC-12	" " "
11	.01	400	70610	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
12	.01	400	70610	484-01	DT4S1	ST-4-01	TC-11	" "
13	.01	400	70610	484-01	DT4S1	ST-4-01	TC-11	" "
14	.007	400	70608	484-0075	DT6D6	ST-6-006	TC-26	Tone Compensation
15	.001	600	70600	684-001	DT6D1	ST-6-001	TC-21	AF Plate Bypass
16	.02	400	71928	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
17	.005	400	72791	484-005	DT6D5	ST-6-005	TC-25	Tone Compensation
18	.02	400	71928	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
19	.001	400	70600	484-001	DT6D1	ST-6-001	TC-21	Phono Tone Compensation
20	.1	400	70617	484-.1	DT4P1	ST-4-1	TC-1	Phono Isolation
21	.05	400	70615	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
22	.1	400	70617	484-.1	DT4P1	ST-4-1	TC-1	Line Isolation
23	.005	400	70606	484-005	DT6D5	ST-4-005	TC-25	Ext. Ant.
24	56	500	39622	1468-00005	5W5Q5	MO.5-45	1FM-45	Tone Comp.

*Parallel sections to obtain desired capacity.

CONTROLS

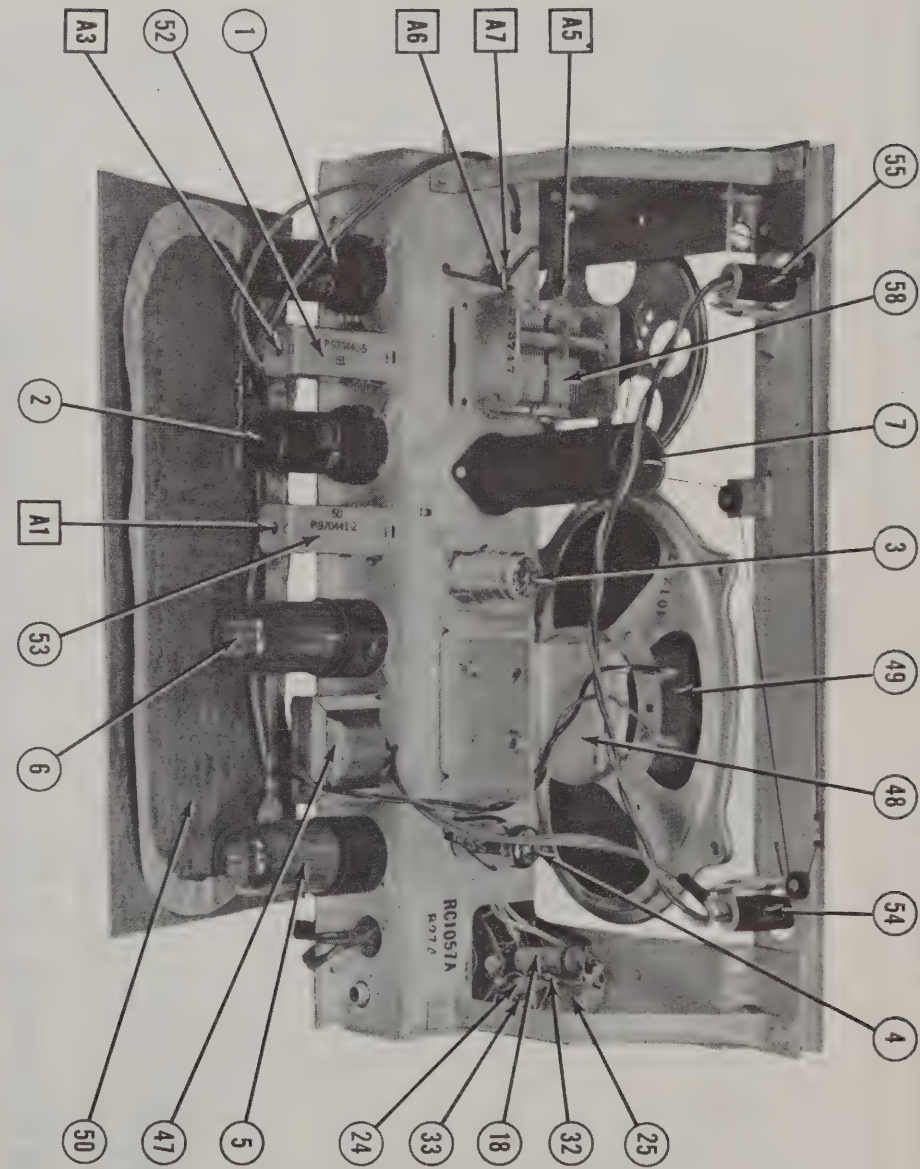
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RCA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
25	2 Meg.	½	38403			Volume Control tapped @ 400KΩ

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RCA PART No.	IRC PART No.	IDENTIFICATION CODES
26	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
27	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
28	270KΩ	½		BTS-270K	Red-V1.-Yl. Diode Load
29	220KΩ	½		BTS-220K	Red-Red-Yl. Diode RF Filter
30	390KΩ	½		BTS-390K	Or.-White-Yl. Phono Shunt
31	82KΩ	½		BTS-82K	Gray-Red-Or. Phono Tone Compensation
32	1.5 Meg.	½		BTS-1.5 Meg.	Br.-Grn.-Grn. Tone Compensation
33	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Tone Compensation
34	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
35	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue Phase Inverter Grid
36	220KΩ	½		BTS-220K	Red-Red-Yl. Phase Inverter Plate Load
37	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate Load
38	470KΩ	½		BTS-470K	Yl.-V1.-Yl. Output Grid
39	470KΩ	½		BTS-470K	Yl.-V1.-Yl. Output Grid
40	12KΩ	½		BTS-12K	Br.-Red-Or. Output Grid
41	82Ω	1		BW-1-82	Gray-Red-Blk. Output Cathode
42	1800Ω	½		BTS-1800	Br.-Gray-Red Filter
43	1200Ω	1		BTA-1200	Br.-Red-Red "
44	66Ω		73038		Blue-Blue-Blk. Pilot Light Shunt-See Note 1
45	95-13.5Ω		73072		Pilot Light Compensation-See Note 2
46	220KΩ	½		BTS-220K	Red-Red-Yl. Line Isolation

Note 1-This is a special positive temperature co-efficient resistor. Order from manufacturer.
Note 2-This is a special negative temperature co-efficient resistor. Order from manufacturer.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		RCA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
47	5000Ω CT	3.6Ω	230Ω CT	.4Ω	73008	A-3856†	T22586†	A-2900†	†Duplicate original mounting.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			RCA PART No.	JENSEN PART No.	QUAM PART No.	
48	FIELD RES. PM	VC IMP. 3.6Ω	72727			
49	CONE DIA. 4-7/8" x 7-1/8"	VC DIA. 3/4"	72728			

R F COILS

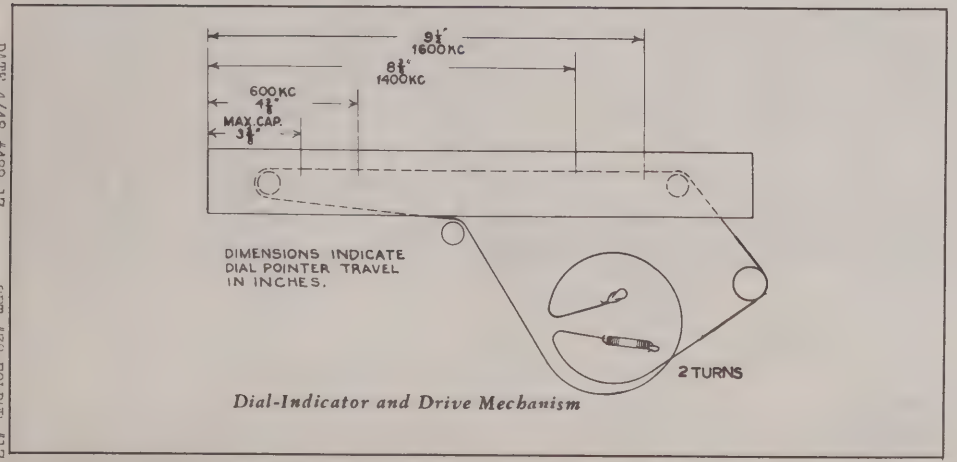
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	RCA PART No.	MEISSNER PART No.	
50	Loop Ant.	.1Ω	1.2Ω	73010		
51	Osc. Coil	.5Ω	4Ω	70477	14-1058‡	‡Add 50MMFD from grid to high side tuning cap.
52	Input IF	18Ω	13Ω	73036	16-6678	
53	Output IF	15Ω	15Ω	73037	16-6678#	#Add 150MMFD from low side sec. to B-.

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					RCA PART No.		
54	Bayonet	7.5	0.2	White	11765		Type 51
55	"	"	"	"	"		" "

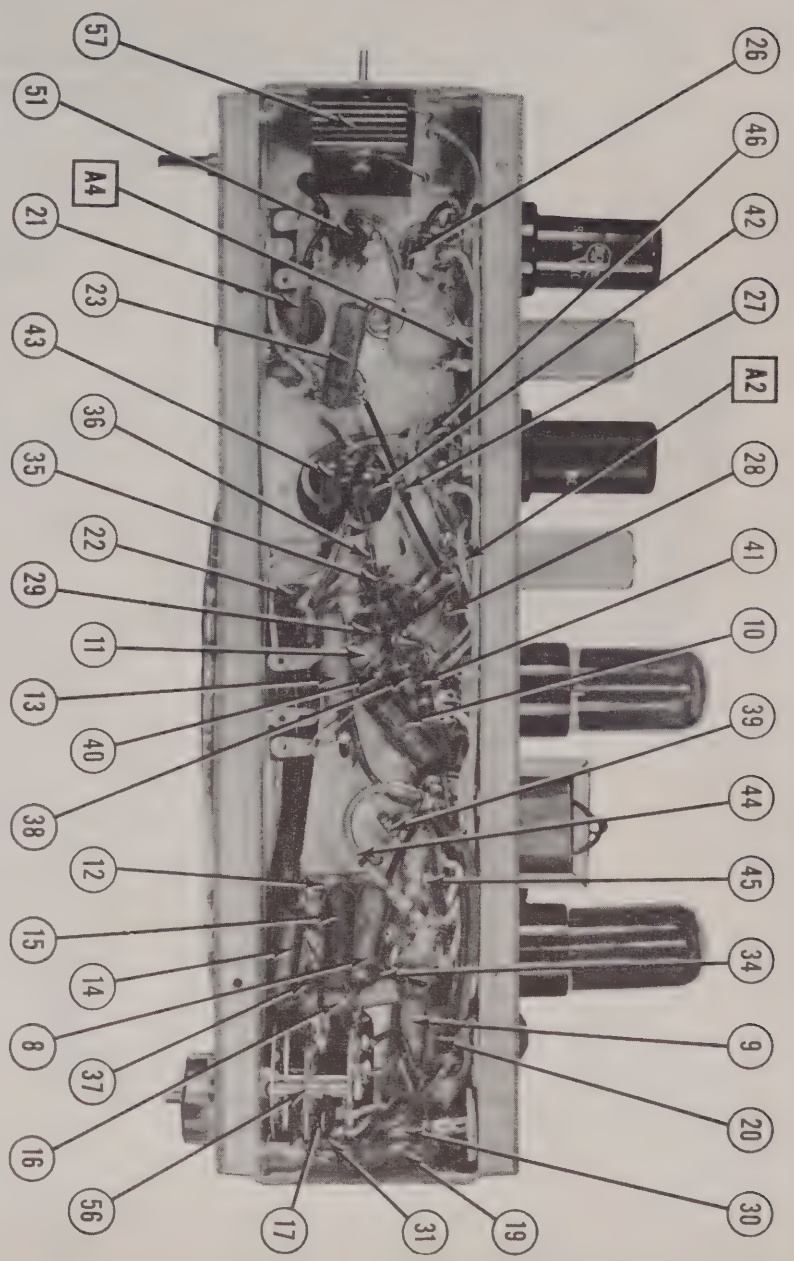
MISCELLANEOUS

ITEM No.	PART NAME	RCA PART No.	NOTES
56	Switch	73011	On-Off-Radio-Phono-Tone
57	Rectifier	73009	Selenium
58	2 Gang Var. Cap.	73007	(23-492MMF, 24-153MMF)
	Dial Scale	73039	Glass
	Dial Pointer	73015	

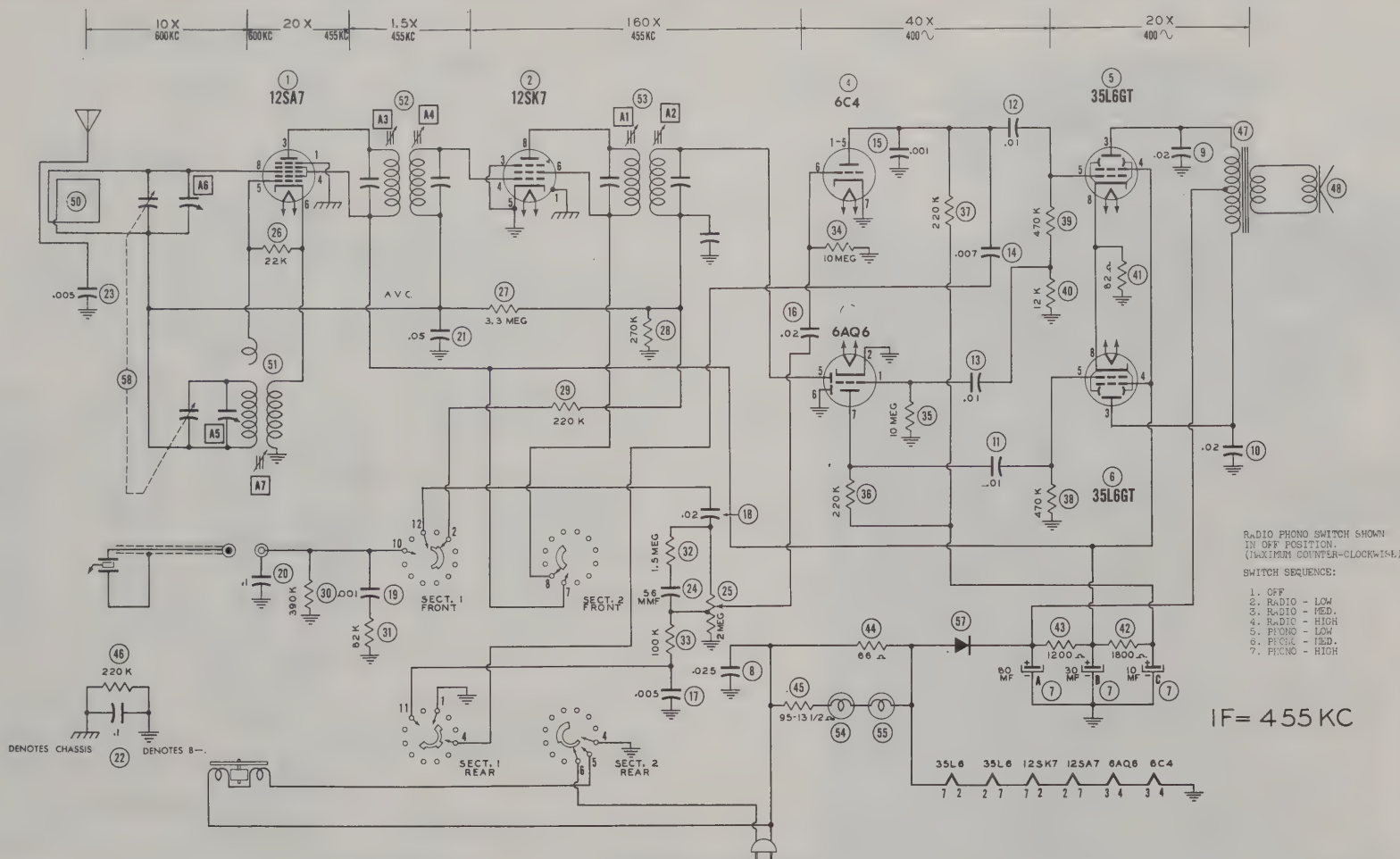


Dial-Indicator and Drive Mechanism

CHASSIS—BOTTOM VIEW



RCA (VICTOR) MODEL 77U



VOLTAGE AND RESISTANCE READINGS TAKEN WITH RADIO-PHONO SWITCH IN RADIO POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	24VAC	90VDC	90VDC	-14VDC§	0V.	12VAC	-.3VDC
2	12SK7	0V.	24VAC	0V.	-.3VDC	0V.	90VDC	36VAC	80VDC
3	6AQ6	-.8VDC	0V.	12VAC	6.1VAC	-.25VDC	0V.	46VDC	-
4	6C4	16VDC	0V.	6.1VAC	0V.	16VDC	-.4VDC	0V.	-
5	35L6GT	0V.	70VAC	120VDC	90VDC	0V.	0V.	107VAC	5.8VDC
6	35L6GT	0V.	70VAC	120VDC	90VDC	0V.	0V.	36VAC	5.8VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	220KΩ	25Ω	80KΩ	80KΩ	22KΩ	.5Ω	12.5Ω	3.5 Meg.
2	12SK7	220KΩ	26Ω	0Ω	3.5 Meg.	0Ω	80KΩ	40Ω	80KΩ
3	6AQ6	10 Meg.	0Ω	12.5Ω	6Ω	270KΩ	0Ω	300KΩ	-
4	6C4	300KΩ	INF.	6Ω	0Ω	300KΩ	10 Meg.	0Ω	-
5	35L6GT	INF.	75Ω	80KΩ	80KΩ	470KΩ	0Ω	40Ω	82Ω
6	35L6GT	INF.	75Ω	80KΩ	80KΩ	480KΩ	0Ω	105Ω	82Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

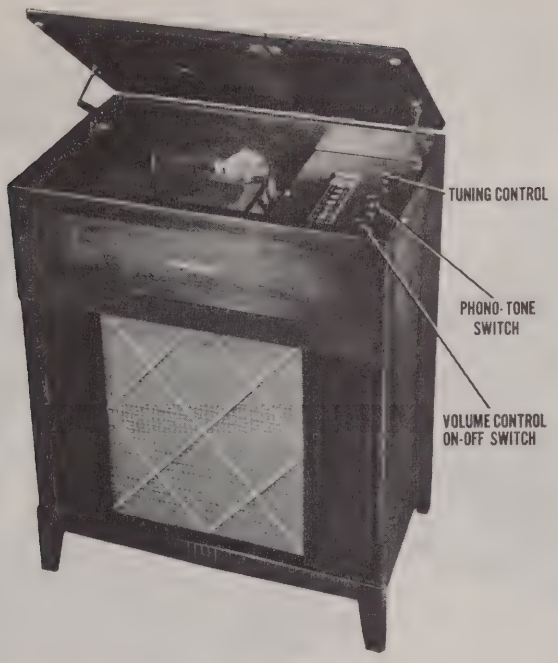
©Howard W. Sams & Co., Inc. 1948

488-17

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RCA (VICTOR) MODEL
77V1 (Ch. RC-615)



RCA (VICTOR) MODEL
77V1 (Ch. RC-615)

RCA (VICTOR) MODEL 77V1

TRADE NAME	RCA (Victor) Model 77V1 (Ch. RC-615)
MANUFACTURER	RCA Victor Div., Radio Corp. of America, Camden, N.J.
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (SEVEN)	Types, 6SA7 Converter, 6SK7 IF Amp., 6SQ7 Det.-AVC-Phase Inv., 6SQ7 AF Amp., (2) 6V6GT Power Output, 6X5GT Rectifier
POWER SUPPLY	105-125 Volts AC
TUNING RANGE—BROADCAST	540-1600KC RATING .46 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

With receiver out of cabinet turn tuning cap. fully closed and set pointer 2½" from extreme left edge of dial backplate.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD.	High side to Pin 4 (grid) 6SK7. Low side to chassis.	455KC	Tuning cap. fully closed.	Across voice coil	A1,A2	Adjust for maximum output.
2	.01 MFD	High side to Pin 8 (grid) 6SA7. Low side to chassis.	"	"	"	A3,A4	" " " "
3	200MMFD	High side to ext. ant. lead. Low side to chassis.	1400KC	7-5/8" from extreme left edge of dial backplate	"	A5	" " " "
4	200MMFD	"	"	Tune for maximum output.	"	A6	" " " "
5	200MMFD	"	600KC	"	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 3, 4 and 5 until no further improvement can be made.

CRITICAL LEAD DRESS

1. Dress speaker cable leads down next to chassis.
2. Dress output plate capacitors next to chassis.
3. Dress plate leads of 6V6 tubes away from 6SQ7 tubes.
4. Dress all AC leads away from volume control down next to chassis.
5. Dress lead from top tap on volume control to range tone switch along front apron of chassis.
6. Dress resistors (34 & 35) down near chassis base.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

RCA (VICTOR)
MODEL 77V1

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RCA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	6SA7	6SA7	8R	
2	IF Amp.	6SK7	6SK7	8N	
3	Det.-AVC-Phase-Inv.	6SQ7	6SQ7	8Q	
4	AF Amp.	6SQ7	6SQ7	8Q	
5	Power Output	6V6GT	6V6GT	7AC	
6	" "	6V6GT	6V6GT	7AC	
7	Rectifier	6X5GT	6X5GT	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RCA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	20	150	71976	AF44J4A	UP2245C	DY-312	EL-350	■ Filter
B	30	150						▲ "
C	20	25						Output Cathode Bypass
9	.0035	1200	70646	684-004	DT6D4	ST-6-004	TC-24	Output Plate Bypass
10	.0035	1200	70646	684-004	DT6D4	ST-6-004	TC-24	" " "
11	.02	400	70611	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
12	.01	400	70610	484-01	DT4S1	ST-4-01	TC-11	" "
13	.005	400	70606	684-005	DT6D5	ST-4-005	TC-25	" "
14	.01	400	70610	484-01	DT4S1	ST-4-01	TC-11	" "
15	.015	200	70572	484-015	DT4S15			Tone Compensation
16	.015	200	70572	484-015	DT4S15			" "
17	.0025	200	70603	484-003	DT6D3	ST-6-003	TC-23	Audio Coupling
18	.002	200	70601	484-002	DT6D2	ST-6-002	TC-22	Phono Tone Comp.
19	.0025	400	70602					Tone Comp.
20	.05	200	70615	484-05	DT4S5	ST-4-05	TC-15	AVC Filter
21	.01	400	70610	484-01	DT4S1	ST-4-01	TC-11	IF Screen Bypass
22	.01	400	70610	484-01	DT4S1	ST-4-01	TC-11	Conv. Screen Bypass
23	120		71614	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass-Cer.
24	56		71924	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.

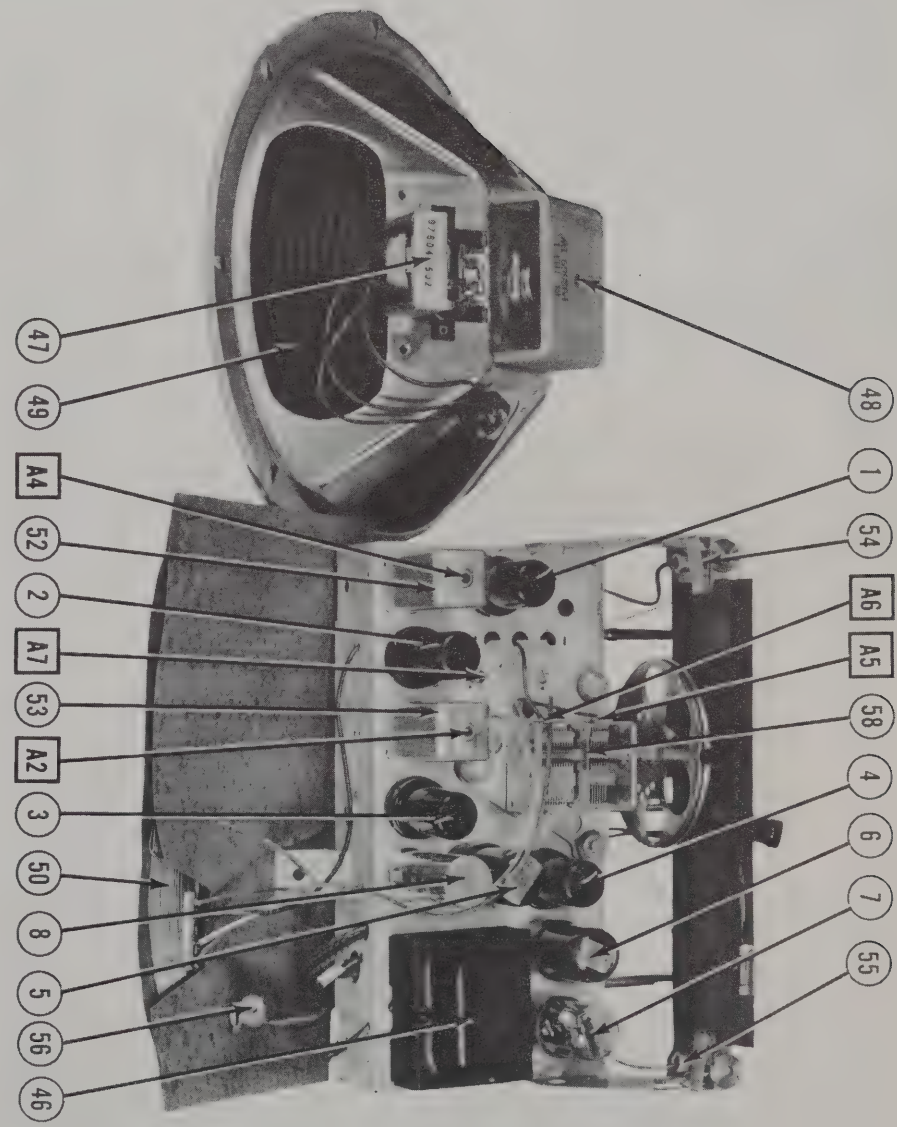
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RCA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
25A	1.5 Meg.	½	70342	D18-139XX	T-95	Volume Control tapped @ 250KΩ and 500KΩ
B	Shaft		Not Req.	A	Not Req.	Attach to 25A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: RCA PART No.	IRC PART No.	IDENTIFICATION CODES
26	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
27	15KΩ	2		BT-2-15K	Br.-Grn.-Or. Converter Screen Dropping
28	56KΩ	½		BTS-56K	Grn.-Blue-Or. Bleeder
29	27KΩ	½		BTS-27K	Red-Vi.-Or. IF Screen Dropping
30	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
31	270KΩ	½		BTS-270K	Red-Vi.-Yl. Diode Load
32	270KΩ	½		BTS-270K	Red-Vi.-Yl. Diode RF Filter
33	270KΩ	½		BTS-270K	Red-Vi.-Yl. AF Plate Load
34	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
35	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue Phase Inverter Grid
36	270KΩ	½		BTS-270K	Red-Vi.-Yl. Phase Inverter Plate Load
37	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
38	8200Ω	½		BTS-8200	Gray-Red-Red " "
39	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. " "
40	330Ω	1		BW-1-330	Or.-Or.-Br. Output Cathode
41	2200Ω	2		BT-2-2200	Red-Red-Red Filter
42	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Phono Shunt

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	RCA PART No.	IRC PART No.	
43	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Phono Tone Compensation
44	18KΩ	½		BTS-18K	Br.-Gray-Or. Tone Compensation
45	27KΩ	½		BTS-27K	Red-Vi.-Or. " "

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	RCA PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
46	117V AC @ .46A	460V CT @ .066A	6.4V AC @ 3.5A		T0127		T22R02*	P-2951#

*Drill new mounting holes.
#Add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		RCA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
47	11000Ω CT	2.2Ω	340Ω CT	.25Ω	37899	A-3823	T22S56*	A-2904	*Drill new mounting holes.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			RCA PART No.	JENSEN PART No.	QUAM PART No.	
48	FIELD RES. PM	VC IMP. 2.2Ω	71961	ST-102† Mod. P12-S	12A4†	†Replace output transformer to match 6-8Ω voice coil.
49	CONE DIA. 12"	VC DIA. 1"	36145			

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	RCA PART No.	MEISSNER PART No.	
50	Loop Ant.	.1Ω	.8Ω	70140		
51	Osc. Coil	1Ω	4.2Ω	70133	14-1060	
52	Input IF	13Ω	12Ω	70128	16-6666	
53	Output IF	11Ω	11Ω	70129	16-6667‡	‡Add 150MMFD from low side sec. to ground.

DIAL LIGHT

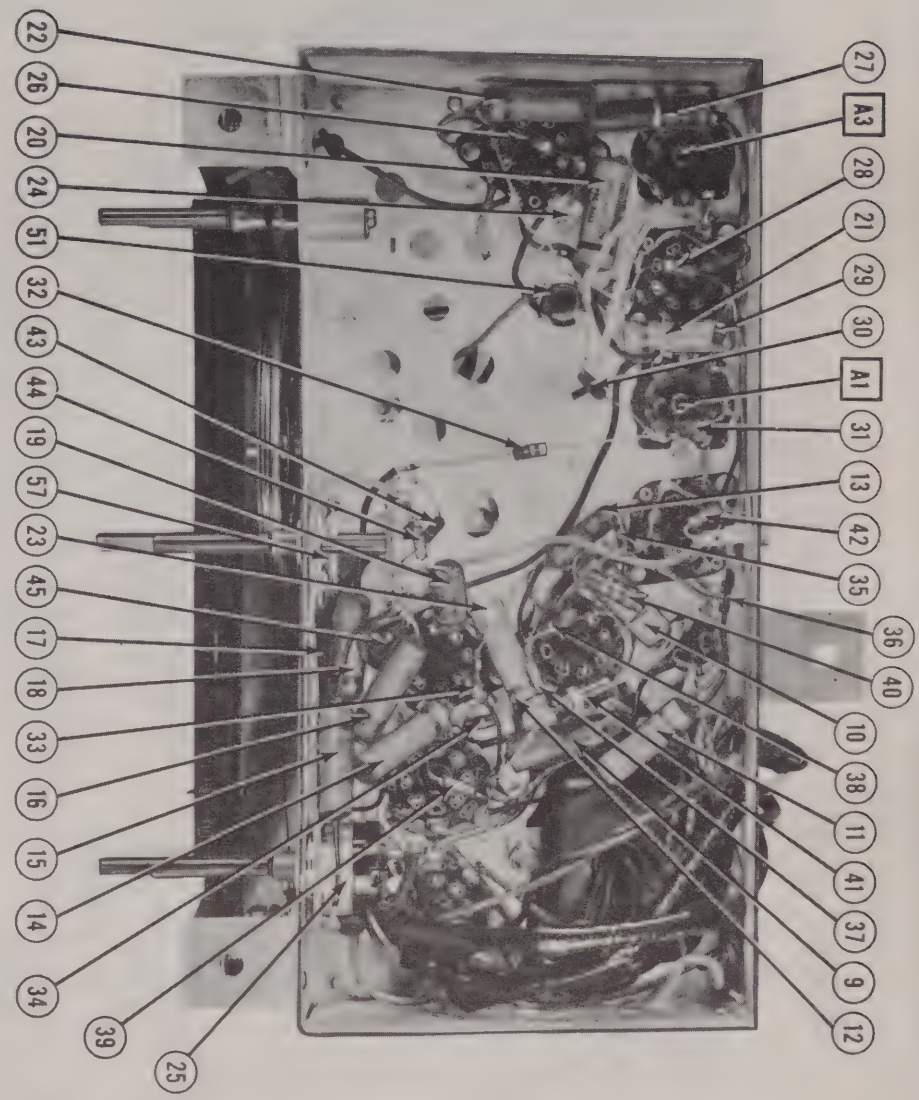
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					RCA PART No.		
54-56	Bayonet	7.5	0.2	White	11765		Type 51

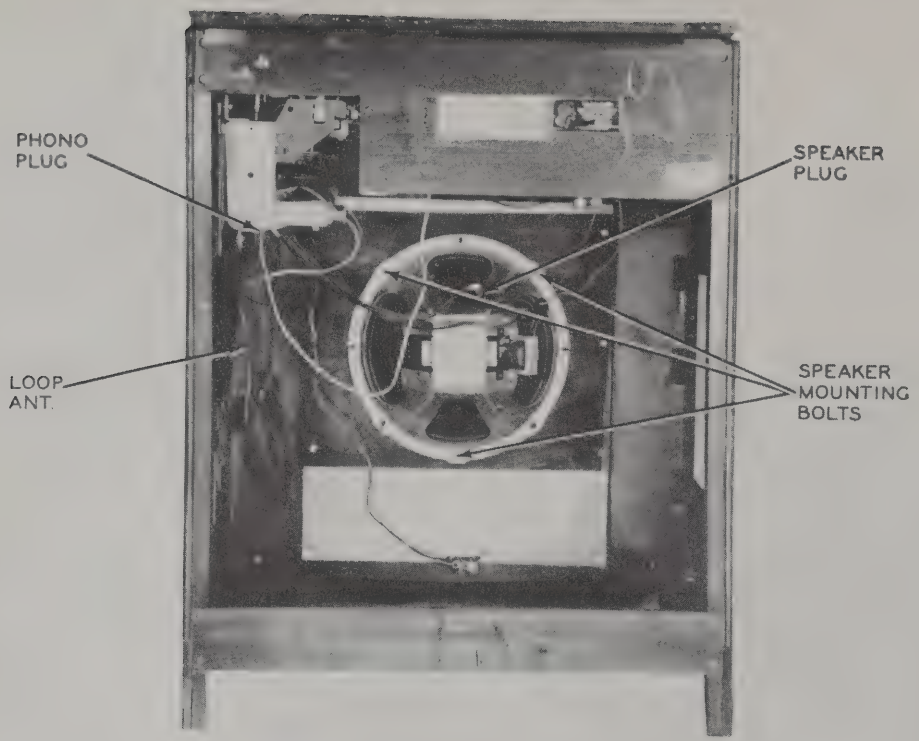
MISCELLANEOUS

ITEM No.	PART NAME	RCA PART No.	NOTES
57	Switch	70134	Radio-Phono-Tone
58	2 Gang Var. Cap.	70139	(27-492MMF, 19-127MMF)
	Dial	70141	Glass
	Dial Pointer	71608	

RCA (VICTOR) MODEL 77V1

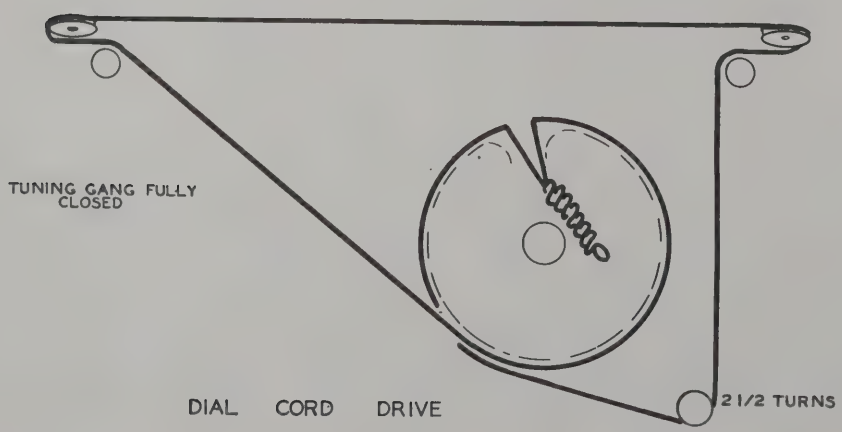
CHASSIS—BOTTOM VIEW





DISASSEMBLY INSTRUCTIONS

1. Remove three push-on type control knobs.
2. Disconnect phono-motor plug.
3. Remove phono-pickup plug from chassis.
4. Remove pilot light from bracket at lower front of cabinet.
5. Remove speaker plug from speaker.
6. Remove staples holding loop antenna in cabinet.
7. Remove three screws holding chassis in cabinet. Remove chassis and loop antenna from cabinet.
8. Remove three hex nuts holding speaker in cabinet. Remove speaker from cabinet.



DIAL CORD DRIVE

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SA7	0V.	0V.	200VDC	82VDC	-15VDC§	0V.	6.4VAC	-.3VDC
2	6SK7	0V.	0V.	0V.	-.3VDC	0V.	72VDC	6.4VAC	200VDC
3	6SQ7	0V.	-.8VDC	0V.	-.5VDC	0V.	90VDC	0V.	6.4VAC
4	6SQ7	0V.	-.7VDC	0V.	0V.	0V.	94VDC	6.4VAC	0V.
5	6V6GT	0V.	0V.	260VDC	200VDC	0V.	0V.	6.4VAC	12VDC
6	6V6GT	0V.	0V.	260VDC	200VDC	0V.	0V.	6.4VAC	12VDC
7	6X5GT	0V.	0V.	230VAC	0V.	230VAC	0V.	6.4VAC	260VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

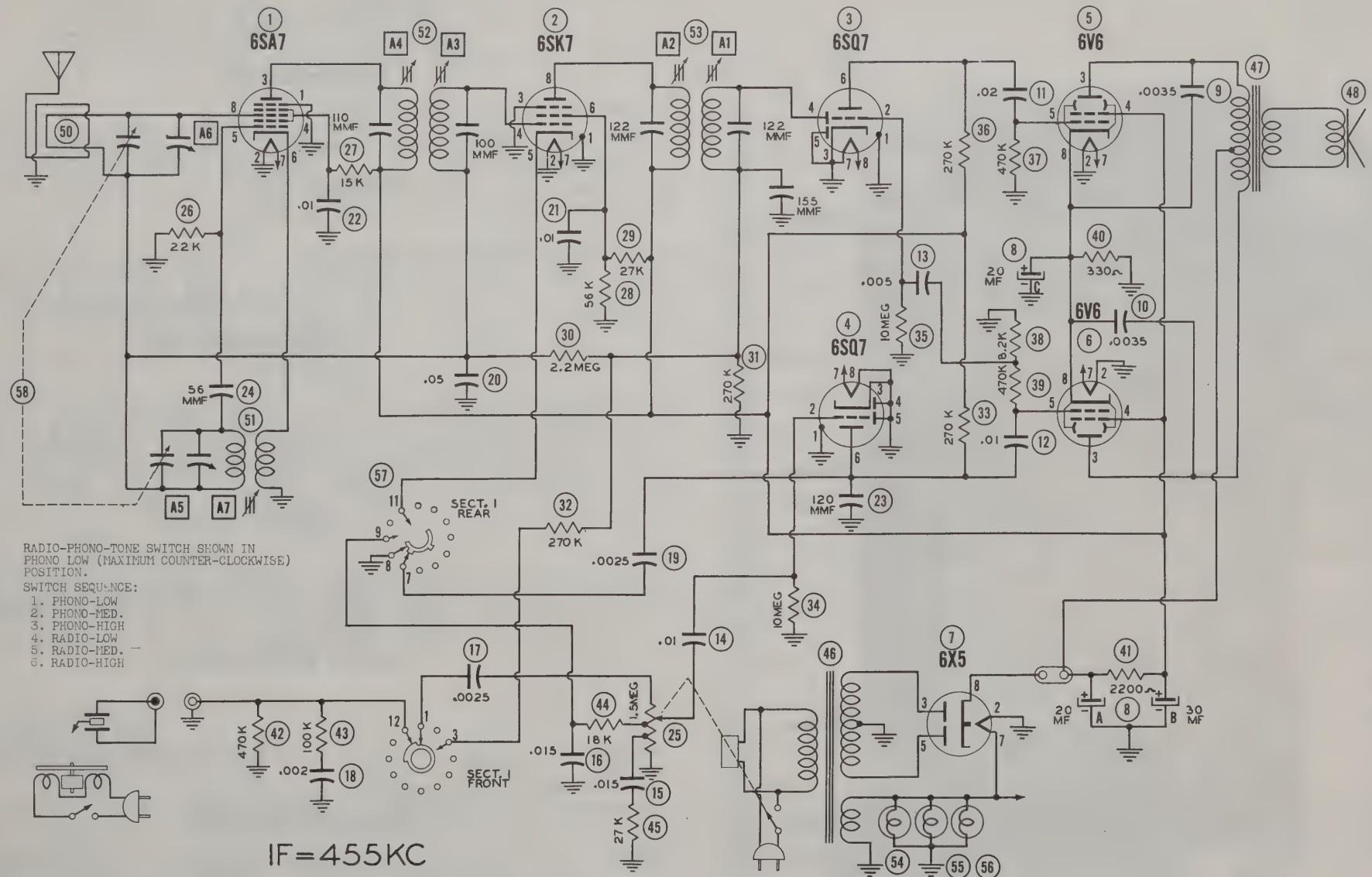
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SA7	0Ω	0Ω	70KΩ	85KΩ	22KΩ	1Ω	.1Ω	2.7 Meg
2	6SK7	0Ω	0Ω	0Ω	2.7 Meg.	0Ω	50KΩ	.1Ω	70KΩ
3	6SQ7	0Ω	10 Meg.	0Ω	250KΩ	0Ω	340KΩ	0Ω	.1Ω
4	6SQ7	0Ω	10 Meg.	0Ω	0Ω	0Ω	340KΩ	.1Ω	0Ω
5	6V6GT	0Ω	0Ω	70KΩ	70KΩ	480KΩ	8KΩ	.1Ω	330Ω
6	6V6GT	0Ω	0Ω	70KΩ	70KΩ	470KΩ	INF.	.1Ω	330Ω
7	6X5GT	0Ω	0Ω	140Ω	INF.	150Ω	INF.	.1Ω	70KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

STAGE GAIN MEASUREMENTS		
ANTENNA TO CONVERTER GRID	25X	600KC
CONVERTER GAIN	10X	IN 600KC
		OUT 455KC
INPUT IF TRANSFORMER	.65X	455KC
IF TUBE	160X	455KC
OUTPUT IF TRANSFORMER	.7X	455KC
AUDIO	50X	400∿
OUTPUT	25X	400∿

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

REGAL MODEL 1500
BATTERY OPERATED

REGAL MODEL 1500
BATTERY OPERATED

REGAL MODEL 1500

TRADE NAME	Regal, Model 1500
MANUFACTURER	Regal Electronics Corp., 605 W. 130th St., New York, N.Y.
TYPE SET	Battery Operated 2 Band Superheterodyne Receiver
TUBES (FOUR)	Types, 1R5 Converter, 1T4 IF Amp., 1S5 Det.-AVC-AF, 3Q4 Power Output.
POWER SUPPLY	1.5 Volts "A" Supply and 90 Volts "B" Supply in Pack Form
RATING	245MA @ 1.5 Volts DC and 20MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1650KC **SHORT WAVE** 5.8-18.3MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning cap. Low side to chassis.	455KC	BC (counter-clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	200MMFD	High side to ext. ant. lead. Low side to chassis.	1650KC	"	"	"	A5	" " " "
3	200MMFD	"	1500KC	"	Tune for max-imum output.	"	A6	" " " "
4	200MMFD	"	600KC	"	"	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 2, 3 & 4 until no further improvement can be made.
5	400Ω carbon res.	"	18.3MC	SW (clock-wise)	Tuning cap. fully open.	"	A8	Adjust for maximum output Tune sig. gen. to 19.21MC If signal is not heard retune sig. gen. to 18.3MC and open A8 to next peak. Adjust for maximum output and re-check for image.
6	"	"	17MC	"	Tune for max-imum output.	"	A9	Rock tuning cap. and adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

REGAL. MODEL 1500

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: REGAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1T4	1T4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3Q4	3Q4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: REGAL PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5A	40	150	60-108	TA-440	PRSA150-40-	EDL4415	DSB-2x40-150	Filter - Red
B	40	150			40			IF Decoupling-Red
6	.006	600	50-101	TC-26	684-006	DT6D6	ST-6-006	Output Plate Bypass
7	.006	600	50-101	TC-26	684-006	DT6D6	ST-6-006	Audio Coupling
8	.05	150	50-104	TC-15	484-05	DT2S5	ST-4-05	AF Screen Bypass
9	.01	400	50-102	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
10	.05	150	50-104	TC-15	484-05	DT2S5	ST-4-05	AVC Filter
11	.05	400	50-104	TC-15	484-05	DT4S5	ST-4-05	IF Decoupling
12	.05	150	50-104	TC-15	484-05	DT2S5	ST-4-05	Conv. Decoupling
13	.006	600	50-101	TC-26	684-006	DT6D6	ST-6-006	Fixed Padder
14	.05	400	50-104	TC-15	484-05	DT4S5	ST-4-05	AVC Filter
15	.05	400	50-104	TC-15	484-05	DT4S5	ST-4-05	RF Bypass Pwr. Supply
16	150	500	55-102	1FM-315	1468-00015	5W5T15	MO.5-315	AF Plate Bypass-Cer.
17	150	500	55-102	1FM-315	1468-00015	5W5T15	MO.5-315	Diode RF Filter-Cer.
18	150	500	55-102	1FM-315	1468-00015	5W5T15	MO.5-315	" " " "

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: REGAL PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
19A	2 Meg.	½	20-104	D13-139	AM-66-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 19A per instructions
C	Switch		" "	42	SW-A2	" " " " " "

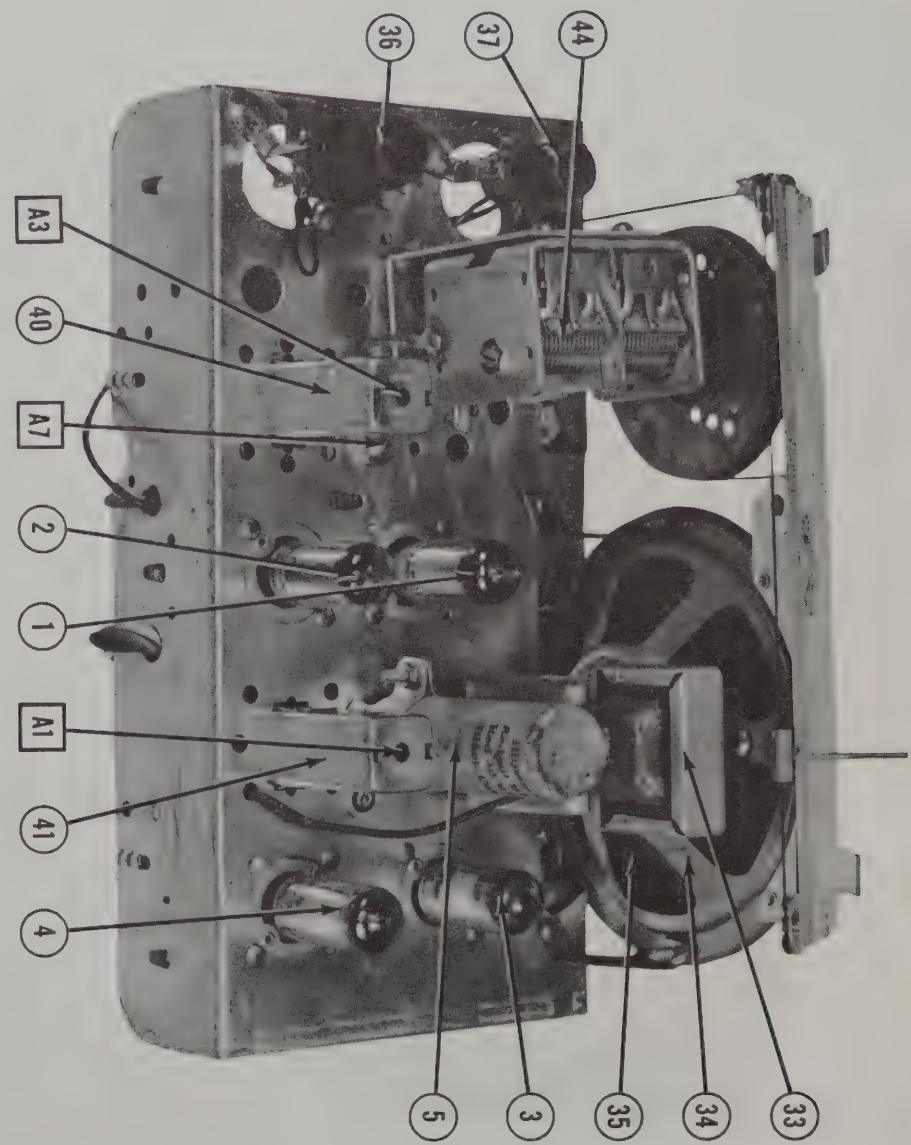
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: REGAL PART No.	IRC PART No.	IDENTIFICATION CODES
20	10KΩ	½	65-147	BTS-10K	Br.-Blk.-Yl. Antenna Loading
21	250KΩ	½	65-108	BTS-220K	Red-Grn.-Yl. AVC Network
22	220KΩ	½	65-108	BTS-220K	Red-Red-Yl. Oscillator Grid
23	390Ω	½	65-143	BW-½-390	Or.-White-Br. Parasitic Suppressor
24	4700Ω	½	65-104	BTS-4700	Yl.-Vi.-Red Converter Decoupling
25	2.2 Meg.	½	65-110	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
26	47KΩ	½	65-106	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
27	10 Meg.	½	65-147	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
28	4.7 Meg.	½	65-145	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Screen Dropping
29	1 Meg.	½	65-144	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate Load
30	2.2 Meg.	½	65-110	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
31	150Ω	½	65-103	BW-½-150	Br.-Grn.-Br. Bias
32	20KΩ	½	65-141	BTS-22K	Red-Blk.-Or. IF Decoupling

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: REGAL PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
33	10000Ω	3.4Ω	490Ω	.5Ω	Part of 110-105	A-3879*	T22S47*	A-2932*	*Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: REGAL PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-107		
34	PM	3.4Ω	110-105	Mod. P5-V	5A1	
	CONE DIA.	VC DIA.				
35	4-3/4"	1/2"				

R F COILS

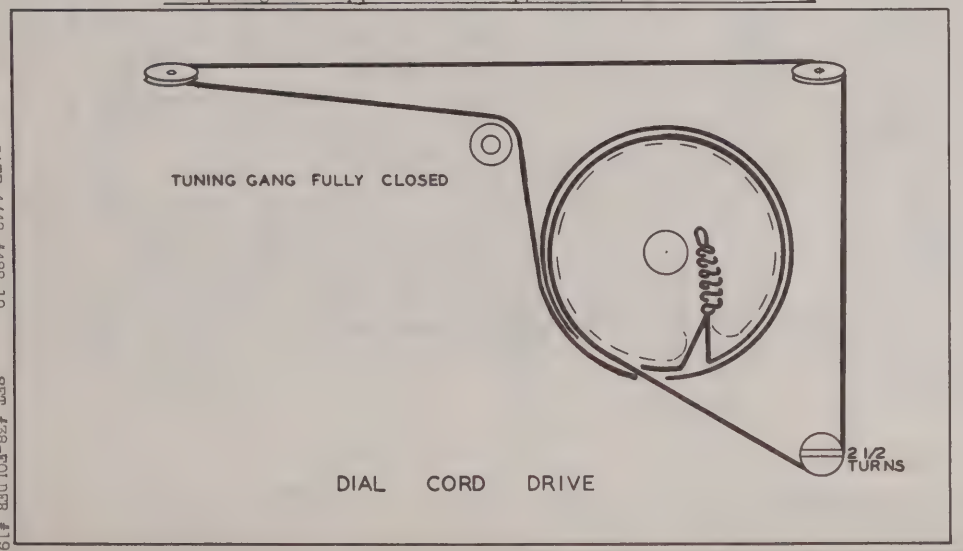
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: REGAL PART No.	MEISSNER PART No.
36	BC Ant.Coil	38Ω	3.7Ω	30-115A	14-1056
37	SW " "	.3Ω	.1Ω	30-132A	
38	BC Osc. "	.5Ω	4.7Ω	30-131A	14-1060
39	SW " "	.3Ω	.1Ω	30-130A	
40	Input IF	28Ω	28Ω	30-135	16-6678
41	Output IF	28Ω	28Ω	30-135	16-6678

BATTERIES

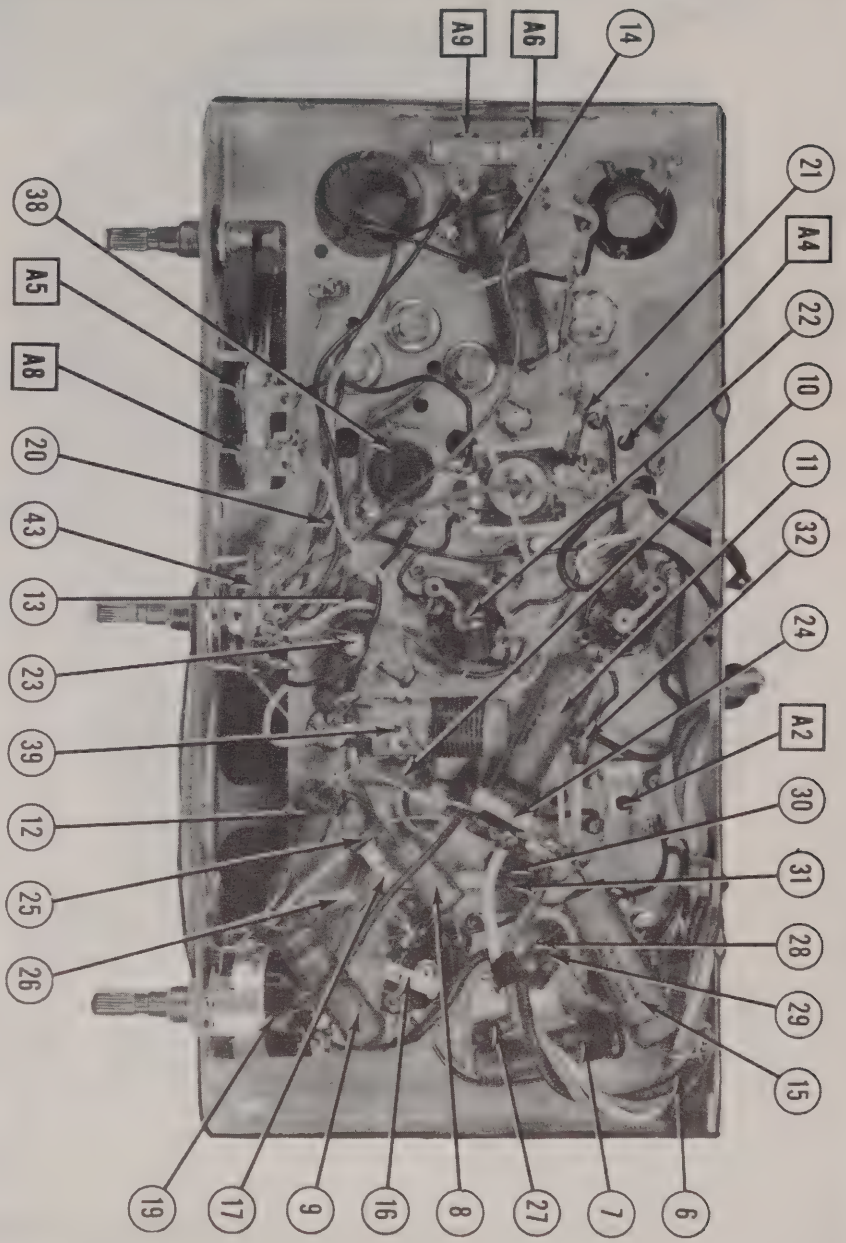
ITEM No.	VOLTAGE	REGAL PART No.	REPLACEMENT DATA: EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
42	1.5V "A" 90V "B"				#758			17GD60	

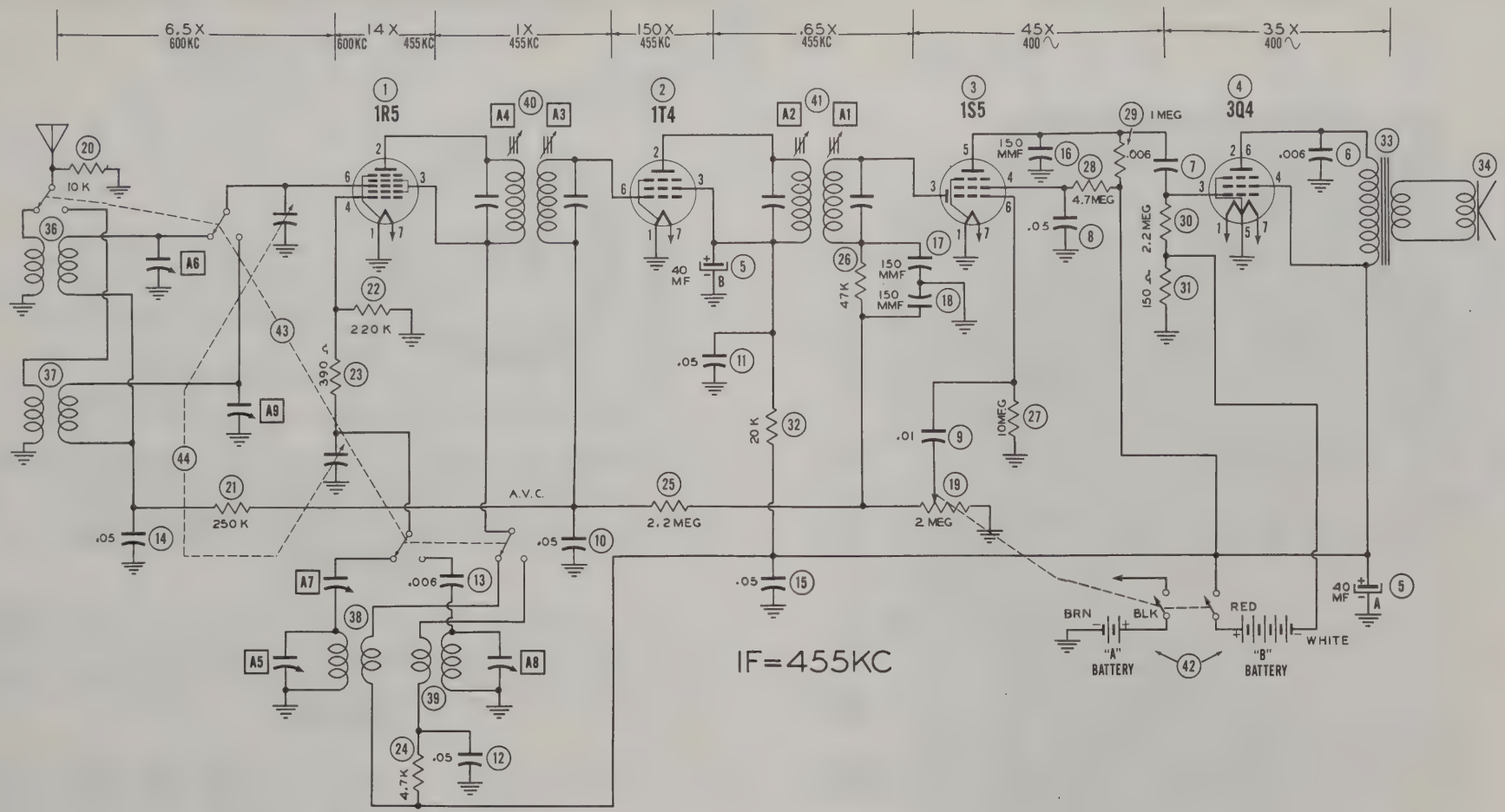
MISCELLANEOUS

ITEM No.	PART NAME	REGAL PART No.	NOTES
43	Switch	95-109	Band
44	2 Gang Var. Cap.	40-107	(12-448MMF) each section



CHASSIS—BOTTOM VIEW





VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	87VDC	87VDC	-15VDC§	0V.	0V.	1.4VDC
2	1T4	0V.	45VDC	45VDC	0V.	0V.	0V.	1.4VDC
3	1S5	0V.	0V.	0V.	14VDC	12.5VDC	0V.	1.4VDC
4	3Q4	1.4VDC	80VDC	-3VDC	95VDC	0V.	80VDC	1.4VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	*	600KΩ	600KΩ	220KΩ	*	5 Meg.	*
2	1T4	*	620KΩ	620KΩ	INF.	*	5 Meg.	*
3	1S5	*	2.5 Meg.	2 Meg.	5.3 Meg	1.6 Meg	10 Meg.	*
4	3Q4	*	600KΩ	2.2 Meg.	600KΩ	*	600KΩ	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

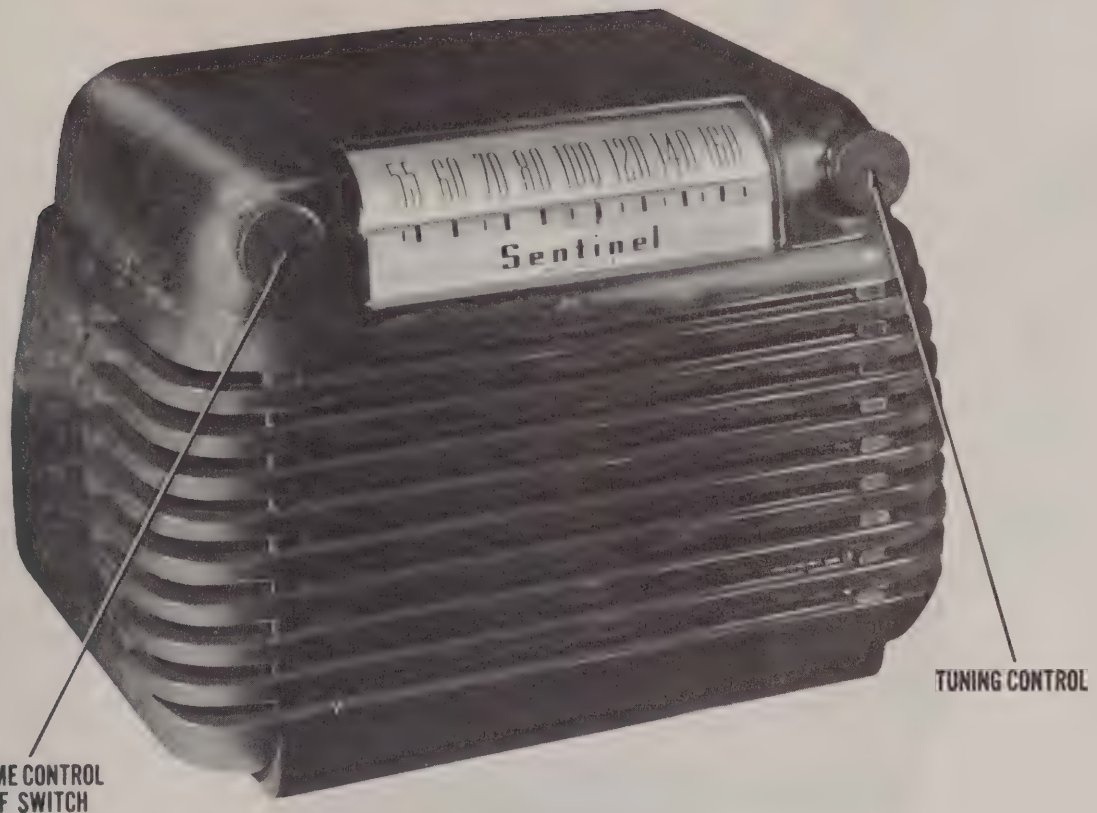
©Howard W. Sams & Co., Inc. 1948

488-19

The stage gain measured values listed above approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.

SENTINEL MODELS 314-E, 314-I, 314-W, IU-314E, IU-314I, IU-314W



SENTINEL MODELS 314-E, 314-I, 314-W, IU-314E, IU-314I, IU-314W

SENTINEL MODEL 314W

TRADE NAME	Sentinel, Models 314E, 314I,314W,IU-314E, IU-314I, IU-314W
MANUFACTURER	Sentinel Radio Corp., 2100 W. Dempster St., Evanston, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (Five)	Types 12SA7GT Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 50L6GT Power Output, 35Z5GT Rectifier
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	530-1650KC
RATING	.23 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.02MFD.	High side to rear stator of tuning capacitor. Low side to B-.	455KC	Tuning capacitor fully open.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output. If isolation transformer is not used reduce dummy antenna to .001 MFD. to reduce hum modulation.
2		Loop	1650KC	Tuning capacitor fully open.	Across voice coil	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		Loop	1400KC	Tune for maximum output.	Across voice coil	A6	Rock tuning capacitor and adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

SENTINEL MODEL 314W

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SENTINEL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7GT	12SA7GT	8AD	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SENTINEL PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	50	150	22SE27	EL-25		UP5515	DY-2X50-150	■ Filter
B	50	150						▲ "
7	.05	400	23E416	TC-15	484-05	DT4S5	ST-4-05	Line Filter
8	.01	200	23E211	TC-11	484-01	DT4S1	ST-4-01	Output Plate Bypass
9	.01	400	*	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
10	.01	200	23E211	TC-11	484-01	DT4S1	ST-4-01	" "
11	.2	400	23E421	TC-2	484-.2	DT4P2	ST-4-.2	Line Isolation-Note
12	.1	200	23E218	TC-1	484-.1	DT4P1	ST-4-.1	AVC Filter
13	250	300	*	1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass
14A	100	300	†	1FM-31	1468-0001	5W5T1	MO.5-31	Diode Filter
B	100	300	†	1FM-31	1468-0001	5W5T1	MO.5-31	" "

*Items 9, 13, 21 & 22 can be obtained as one unit under Part #23E2023
†Items 14A, 14B & 19 can be obtained as one unit under Part #23E2022
Note: Used in Underwriters Approved Models only.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SENTINEL PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
15A	500KΩ	½	28E1	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E#	KSS-3#	Attach to 15A per instructions.
C	Switch		Not Req.	41	SW-A	" " " " "

#Wrap Scotch tape around shaft adjacent to lock ring for dial cord surface.

RESISTORS

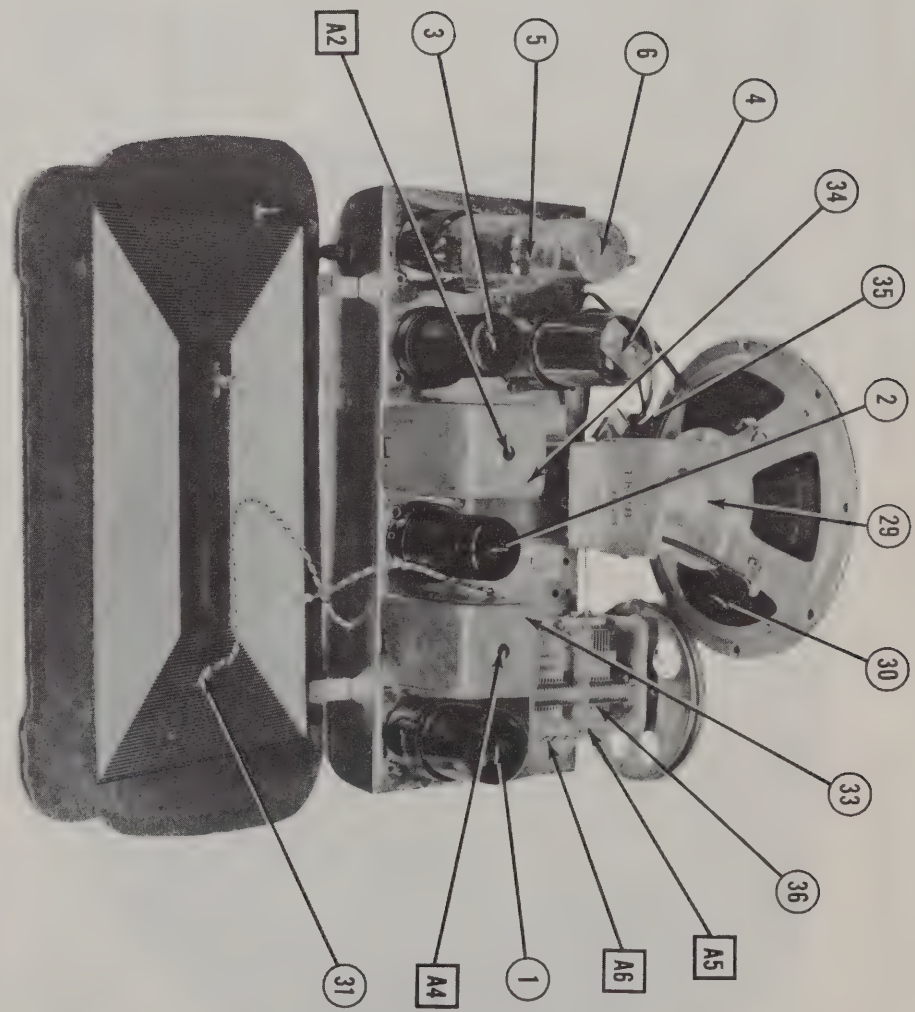
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SENTINEL PART No.	IRC PART No.	IDENTIFICATION CODES
16	22KΩ	⅓	27E223	BTS-22K	Red-Red-Or. Oscillator Grid
17	10 Meg.	⅓	27E106	BTS-10 Meg.	Br.-Blk.-Blue AVC Network
18	3.3 Meg.	⅓	27E335	BTS-3.3 Meg.	Or.-Or.-Grn. " "
19	47KΩ		†	BTS-47K	Diode RF Filter
20	3.3 Meg.	⅓	27E335	BTS-3.3 Meg.	Or.-Or.-Grn. AF Grid
21	250KΩ		*	BTS-270K	AF Plate Load
22	500KΩ		*	BTS-470K	Output Grid
23	150Ω	⅓	27E151	BW-½-150	Br.-Grn.-Br. Output Cathode
24	2200Ω	1	27E222-3	BTA-2200	Red-Red-Red Filter
25	100Ω	⅓	27E101	BW-½-100	Br.-Blk.-Br. Pilot Light Shunt
26	47Ω	⅓	27E470-2	BW-½-47	Yl.-Vi.-Blk. Surge Limiter
27	220KΩ	⅓	27E224	BTS-220K	Red-Red-Yl. Line Isolation - See Note

†Items 19, 14A & 14B can be obtained as one unit under Part #23E2022.
*Items 21, 22, 9 & 13 can be obtained as one unit under Part #23E2023.
Note: Used in Underwriters Approved Models only.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SENTINEL PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	INSTALLATION NOTES
28	4000Ω	3.2Ω	237Ω	1.0Ω	22E2	A-3876	T22S45	A-2928	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA SENTINEL PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-107*	5A1*	*Fabricate new mounting bracket.
29A	PM	3.2Ω	1E28	Mod. P5-V		
B			1E9			Alternate speaker
	CONE DIA.	VC DIA.				
30	4¾"	½"	Cone has special adjustment feature. Order from manufacturer.			

R F COILS

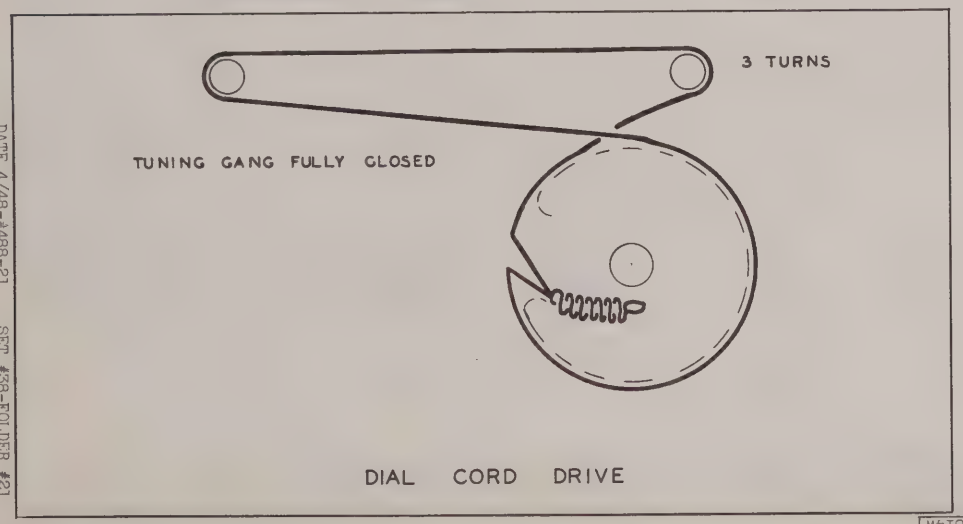
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA SENTINEL PART No.	REPLACEMENT DATA MEISSNER PART No.	
31A	Loop Ant.		1.8Ω	20E322		
B	Loop Ant.			20E323		Alternate
32A	Osc.Coil	.5Ω	8.5Ω	20E162	14-1060‡	‡Add 50 MMFD from Grid to high side tuning capacitor. Use with 1U-314 models only.
B	Osc.Coil			20E346		
33A	Input IF	9.5Ω	9.5Ω	20E307	16-5740	
B	Input IF			20E261	16-5740	Alternate
34A	Output IF	9.5Ω	9.5Ω	20E307-2	16-5742	
B	Output IF			20E261-2	16-5742	Alternate

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA SENTINEL PART No.		INSTALLATION NOTES
35	Bayonet	6-8V	0.15A	Brown	40E1		Type 47

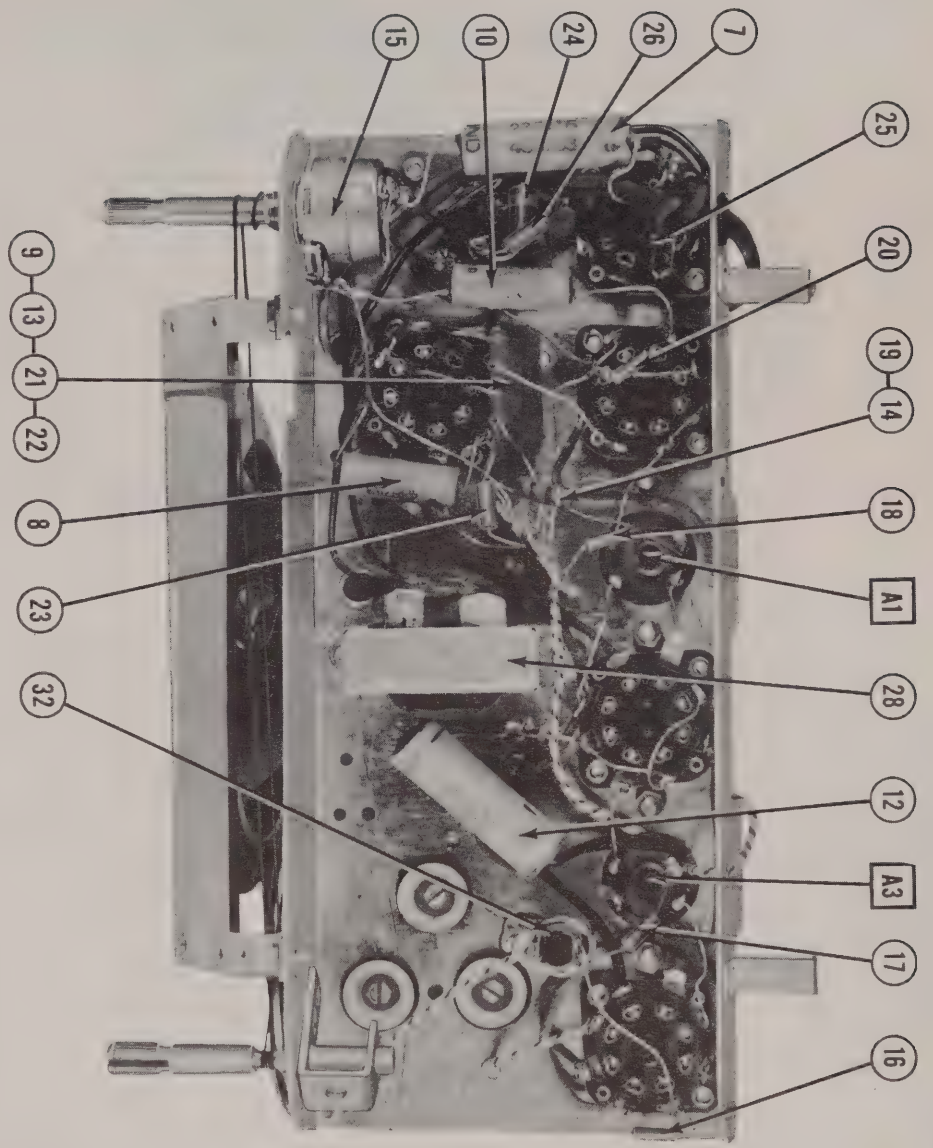
MISCELLANEOUS

ITEM No.	PART NAME	SENTINEL PART No.	NOTES
36	2 Gang Var.Cap.	24E2	(39-450MMFD. 33-196 MMFD)
	Dial Crystal	9E2	
	Dial Scale	36E35	
	Dial Pointer	35E22	

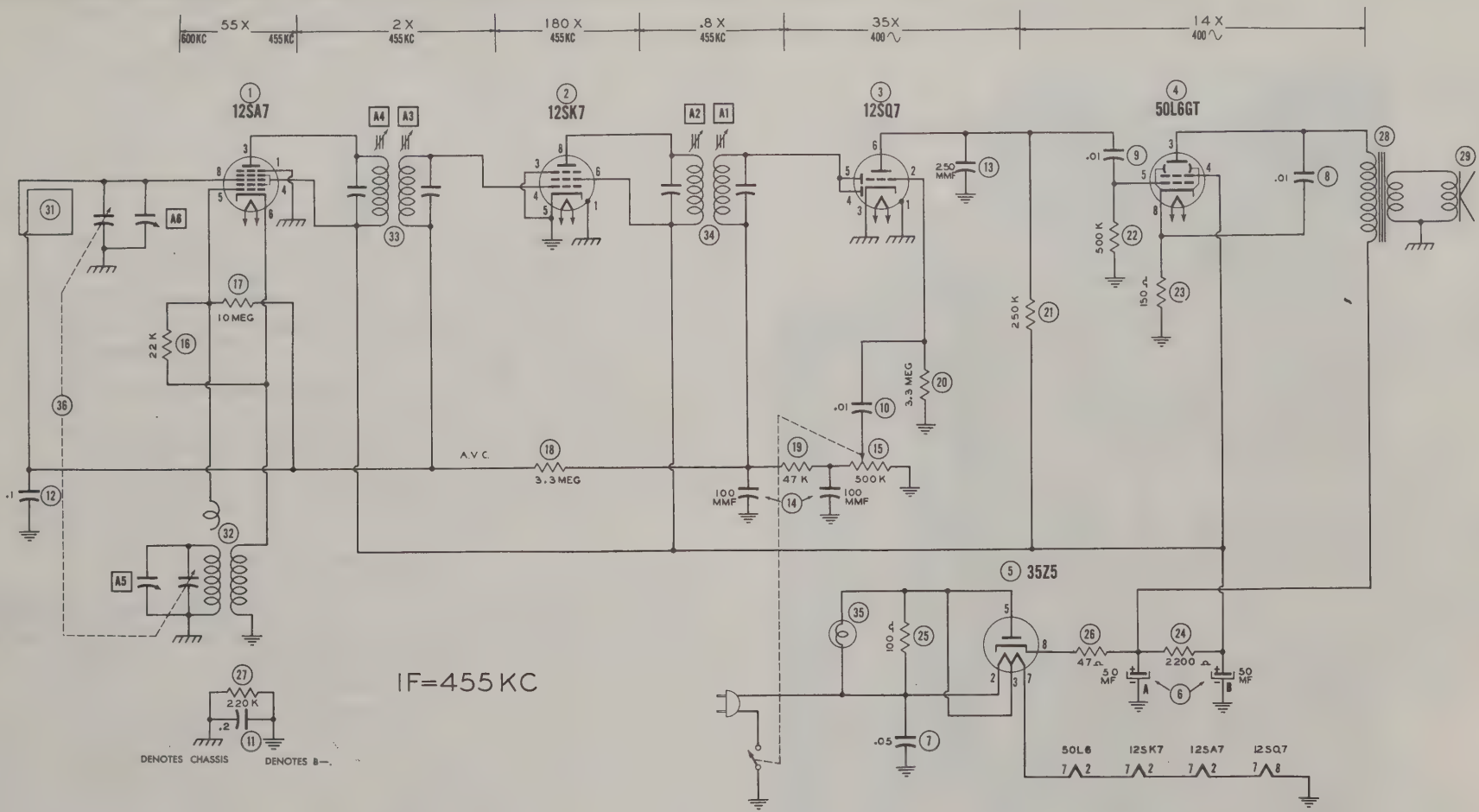


DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW



SENTINEL MODEL 314W



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0V.	13VAC	75VDC	75VDC	-9VDC§	0V.	26VAC	-.6VDC
2	12SK7	0V.	26VAC	0V.	-.6VDC	0V.	75VDC	39VAC	75VDC
3	12SQ7	0V.	-.6VDC	0V.	-.4VDC	-.4VDC	45VDC	13VAC	0V.
4	50L6GT	0V.	39VAC	110VDC	75VDC	0V.	0V.	86VAC	4.6VDC
5	35Z5GT	0V.	117VAC	115VAC	0V.	115V&C	0V.	86VAC	122VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0Ω	13Ω	60KΩ	60KΩ	22KΩ	.5Ω	25Ω	3.8 Meg.
2	12SK7	0Ω	25Ω	0Ω	3.8 Meg.	0Ω	60KΩ	37Ω	60KΩ
3	12SQ7	0Ω	3.3 Meg.	0Ω	540KΩ	540KΩ	310KΩ	13Ω	0Ω
4	50L6GT	0Ω	37Ω	60KΩ	60KΩ	500KΩ	INF.	85Ω	150Ω
5	35Z5GT	INF.	112Ω	110Ω	INF.	110Ω	INF.	85Ω	60KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

488-21

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

SILVERTONE MODEL 7350
(Ch. 435.410)

SILVERTONE MODEL 7350

TRADE NAME	Silvertone, Model 7350 (Ch. 435.410)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan St., Chicago, Ill.
TYPE SET	AC Operated 2 Channel Amplifier with Phono Player
TUBES (FIVE)	Types, 7B4 Mic. Amp., 7F7 AF-Phase Inv. (2) 7C5 Power Output, 7Z4 Rectifier.
POWER SUPPLY	105-125 Volts AC RATING .58 Amp. @ 117 Volts AC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7B4	0V.	230VDC	0V.	0V.	0V.	0V.	2VDC	6.6VAC
2	7F7	0V.	3VDC	250VDC	0V.	0V.	250VDC	3VDC	6.6VAC
3	7C5	0V.	310VDC	320VDC	0V.	0V.	0V.	20VDC	6.6VAC
4	7C5	0V.	310VDC	320VDC	0V.	0V.	0V.	20VDC	6.6VAC
5	7Z4	0V.	0V.	320VAC	0V.	0V.	320VAC	340VDC	6.6VAC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7B4	0Ω	300KΩ	INF.	INF.	INF.	2 Meg.	4KΩ	.1Ω
2	7F7	0Ω	2.2KΩ	230KΩ	250KΩ	10KΩ	230KΩ	2.2KΩ	.1Ω
3	7C5	0Ω	130KΩ	130KΩ	INF.	INF.	480KΩ	250Ω	.1Ω
4	7C5	0Ω	130KΩ	130KΩ	INF.	INF.	470KΩ	250Ω	.1Ω
5	7Z4	0Ω	INF.	120Ω	INF.	INF.	125Ω	130KΩ	.1Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, no signal applied for voltage measurements.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

SILVERTONE MODEL 7350

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		SILVERTONE PART No.	STANDARD REPLACEMENT		
1	Mic. Amp.	7B4	7B4	5AC	
2	AF-Phase Inv.	7F7	7F7	8AC	
3	Power Output	7C5	7C5	6AA	
4	" "	7C5	7C5	6AA	
5	Rectifier	7Z4	7Z4	5AB	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
6A	40	400	IC38-422-400	AF444J	UP222245*	DY-3x20-450	EL-240	◓ Filter
B	20	400						■ "
C	20	400		PRS450-20	BR2045	M-20-450	UT-20	▲ "
7A	20	25	IC28-22-25	AF44D	UP2215	DY-2x20-25	EL-321	■ Cathode Bypass
B	20	25						▲ " "
8	.05	400		484-05	DT4S5	ST-4-05	TC-15	Audio Coupling
9	.05	400		484-05	DT4S5	ST-4-05	TC-15	" "
10	.01	400		484-01	DT4S1	ST-4-01	TC-11	Tone Compensation
11	.05	400		484-05	DT4S5	ST-4-05	TC-15	Audio Coupling
12	.1	400		484-.1	DT4P1	ST-4-.1	TC-1	Line Filter

*Parallel sections to obtain desired capacity.

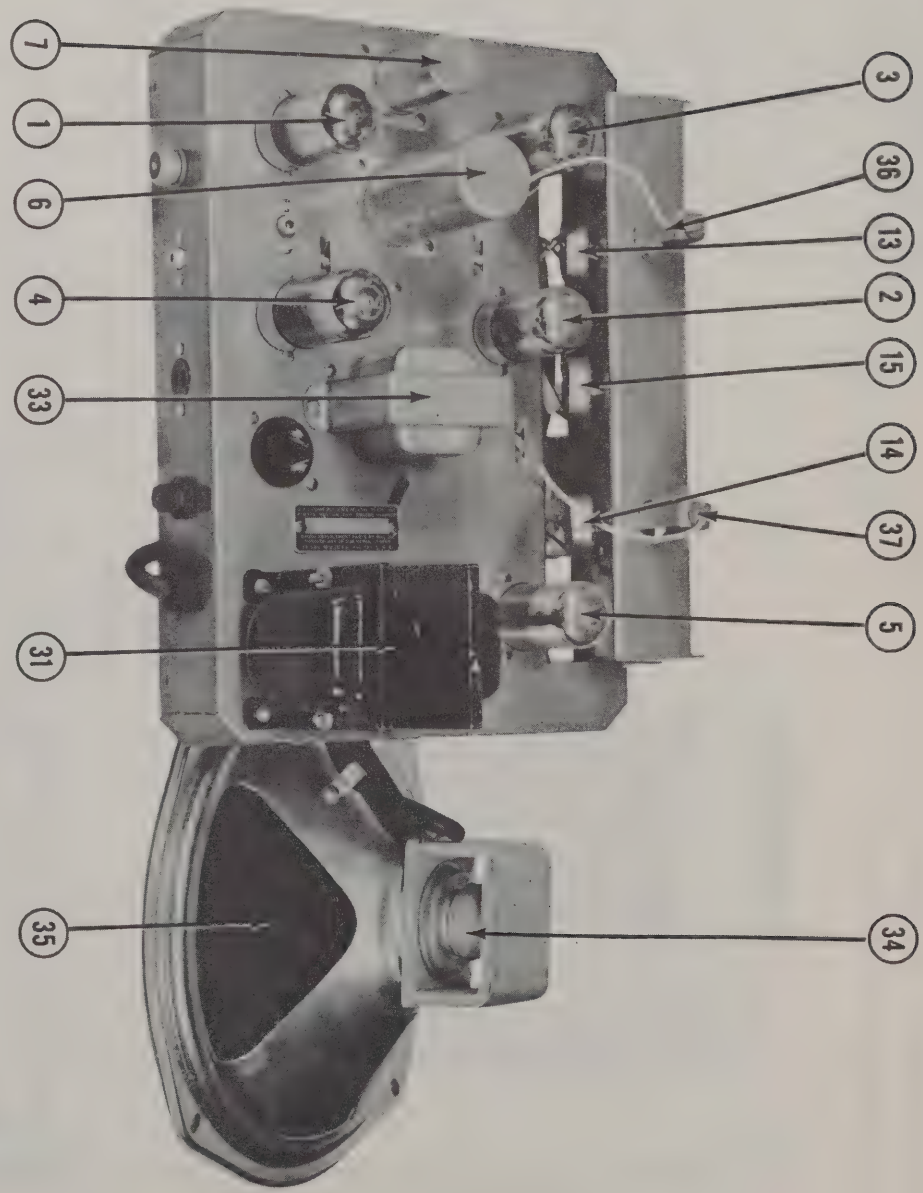
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	SILVERTONE PART No.	IRC PART No.	CLAROSTAT PART No.	
13A	500KΩ	½	IVC-500K	D11-133	M-58-S	Mike Control
B	Shaft		Not Req.	A	Not Req.	Attach to 13A per instructions
14A	500KΩ	½	IVC-500K	D11-133	M-58-S	Phono Control
B	Shaft		Not Req.	A	Not Req.	Attach to 14A per instructions
15A	100KΩ	½	IVC-100K	D11-128	M-49-S	Tone Control Later Production
B	Shaft		Not Req.	A	Not Req.	Attach to 15A per instructions
15A	250KΩ	½	IVC-250K	D11-130	M-55-S	Tone Control Early production
B	Shaft		Not Req.	A	Not Req.	Attach to 15A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	SILVERTONE PART No.	IRC PART No.	
16	2 Meg.	½		BTS-2.2 Meg.	Red-Blk.-Grn. Mic. Amp. Grid
17	4000Ω	½		BTS-3900	Yl.-Blk.-Red Mic. Amp. Cathode
18	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Mic. Amp. Plate Load
19	75KΩ	1		BTA-68K	Vi.-Grn.-Or. Mic. Amp. Plate Decoupling
20	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. Isolation
21	500KΩ	½		BTS-470K	Grn.-Blk.-Yl. "
22	2000Ω	½		BTS-2200	Red-Blk.-Red Phase Inverter Cathode
23	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Phase Inverter Plate Load
24	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AF Plate
25	10KΩ	½		BTS-10K	Br.-Blk.-Or. Phase Inverter Grid
26	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
27	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. " "
28	250Ω	5	IR-250-5WW	AB-250	Output Cathode
29	30KΩ	½		BTS-33K	Or.-Blk.-Or. Feedback
30	200Ω	½		BW-½-220	Red-Blk.-Br. "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	SILVERTONE PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
31	117V AC @ .58A	640V CT @ .088A	6.6V AC @ 3.0A		ITP-410	P-4079†	T22R31†	P-3152†

†Drill new mounting holes.

FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~)	SILVERTONE PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	
32	.088A	270Ω	.6 Henries	ITC-410	C-1709	T20C53	C-2993‡	‡Drill one new mounting hole.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SILVERTONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
33	11000 Ω CT	3.9Ω	450Ω CT	.4Ω	ITO-410	A-3870	T22856	A-2904‡	‡Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD	VC IMP.	SILVERTONE PART No.	JENSEN PART No.	QUAM PART No.	
34	PM	3.9Ω	ISP-10PM-32	ST-120# Mod. P10-S	10A31	#Replace output transformer to match 6-8Ω voice coil.
	CONE DIA.	VC DIA.				
35	9"	1"				

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					SILVERTONE PART No.		
36	Bayonet	6-8	0.15	Brown			Type 47
37	"	"	"	"			" "

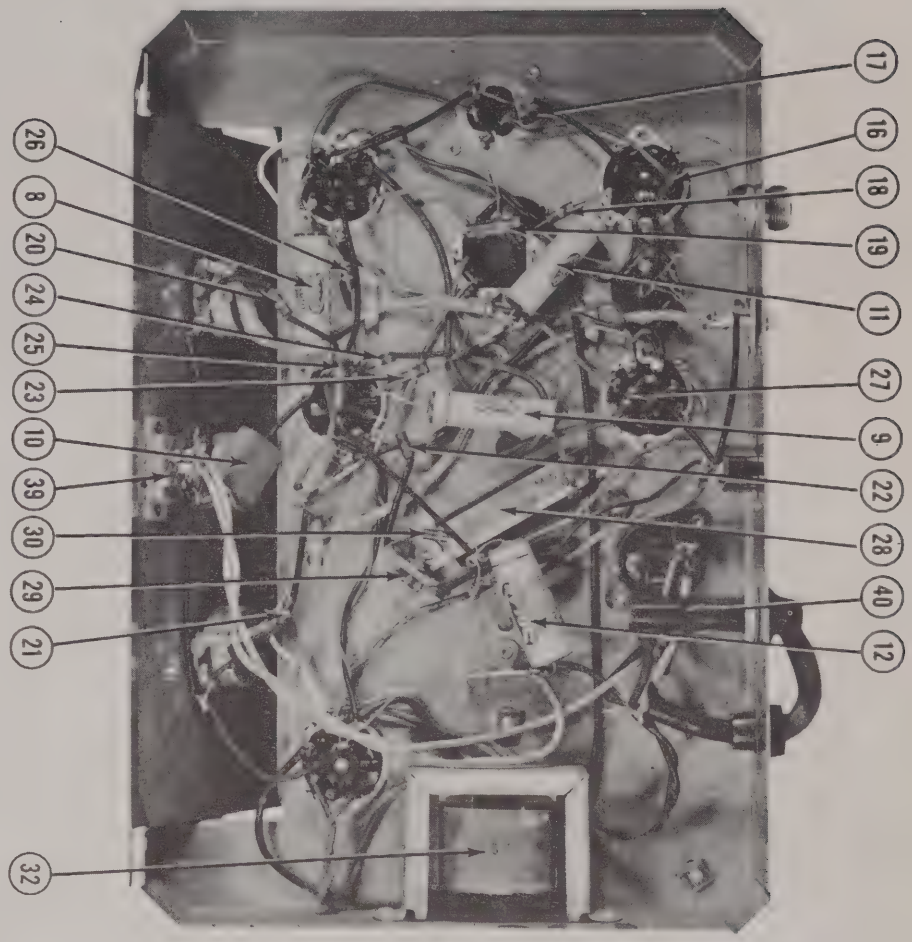
PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA		REMARKS
	SILVERTONE PART No.	ASTATIC PART No.	
38		L-70-A	L-70-AZ original part.

MISCELLANEOUS

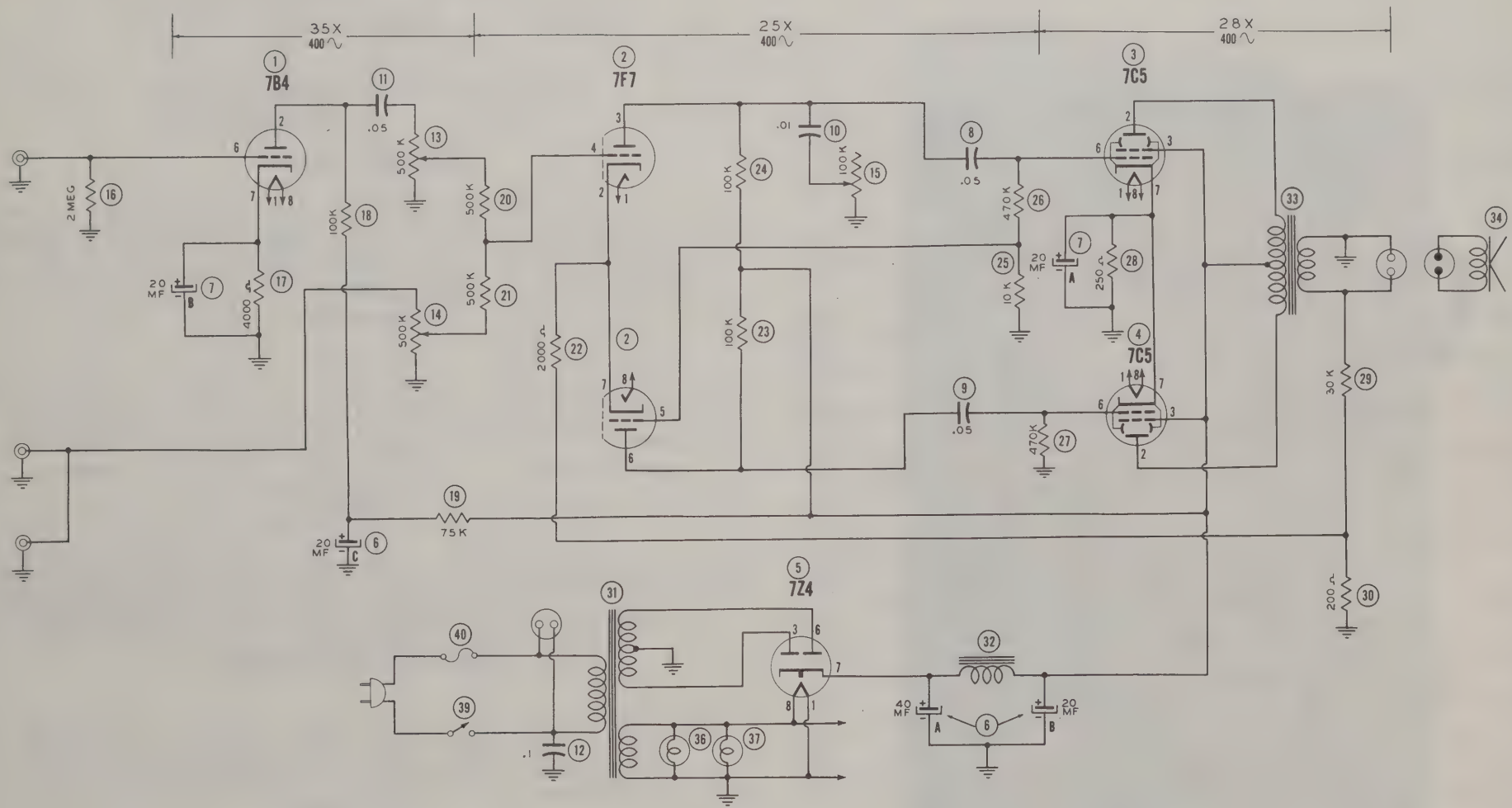
ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
39	Switch	ISW-SS1	On-Off
40	Fuse		2 Amp.
	Knob	IKN-1	

CHASSIS—BOTTOM VIEW



DATE 4/48-#488-22 SET #38-FOLDER #22

SILVERTONE MODEL 7250



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

SPARTON MODEL 100

TRADE NAME	Sparton, Models 100, 101, 102, 103, 104 (Ch. 5-A7)
MANUFACTURER	Sparks-Withington Co., Jackson, Mich.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7GT Converter, 12SH7 IF Amp., 12SQ7GT Det.-AVC-AF, 50L6GT Power Output, 35Z5GT or 35Z4GT Rectifier.
POWER SUPPLY	100-130 Volts AC-DC
TUNING RANGE—BROADCAST	539-1620KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.02 MFD	High side to Pin 8 (grid) 12SA7. Low side to B-.	456KC	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	.02 MFD	"	1500KC	1500KC	"	A3	Adjust for maximum output. Trimmer opposite A3 is a factory adjustment and ordinarily need not be changed. Install receiver in cabinet.
3		Loop	"	Tune for maximum output.	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Check calibrations at 600, 1000 & 1500KC.

SPARTON MODELS
100, 101 (Ch. 5-A7

SPARTON MODELS
100, 101 (Ch. 5-A7

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

SPARTON MODEL 100

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SPARTON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7GT	12SA7GT	8AD	
2	IF Amp.	12SH7	12SH7	8BK	
3	Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
4	Power Output	50L6GT	50L6GT	7AC	
5A	Rectifier	35Z5GT	35Z5GT	6AD	
B	"	35Z4GT	35Z4GT	5AA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SPARTON PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	A9000-2	TA-430	PRSA150-30-40	EDL4415	DSB-2x40-150	Filter-Yellow
B	30	150						" -Red
7	.05	400	B9002GL503	TC-15	484-05	DT4S5	ST-4-05	Line Filter
8	.01	400	B9002GL103	TC-11	484-01	DT4S1	ST-4-01	Output Plate Bypass
9	.002	400	B9002GL202	TC-22	484-002	DT6D2	ST-6-002	Audio Coupling
10	.002	400	B9002GL202	TC-22	484-002	DT6D2	ST-6-002	" "
11	.05	200	B9002GK503	TC-15	484-05	DT4S5	ST-4-05	AVC Filter
12	.1	200		TC-1	484-1	DT4P1	ST-4-1	RF Bypass Pwr. Supply
13	.05	400	B9002GL503	TC-15	484-05	DT4S5	ST-4-005	Line Isolation
14	500	500	A9010-1	1FM-35	1468-0005	5W5T5	MO.5-35	AF Plate Bypass-Cer.
15	500	500	A9010-1	1FM-35	1468-0005	5W5T5	MO.5-35	Diode Filter-Cer.
16	500	500		1FM-35	1468-0005	5W5T5	MO.5-35	IF Coupling-Silver

CONTROLS

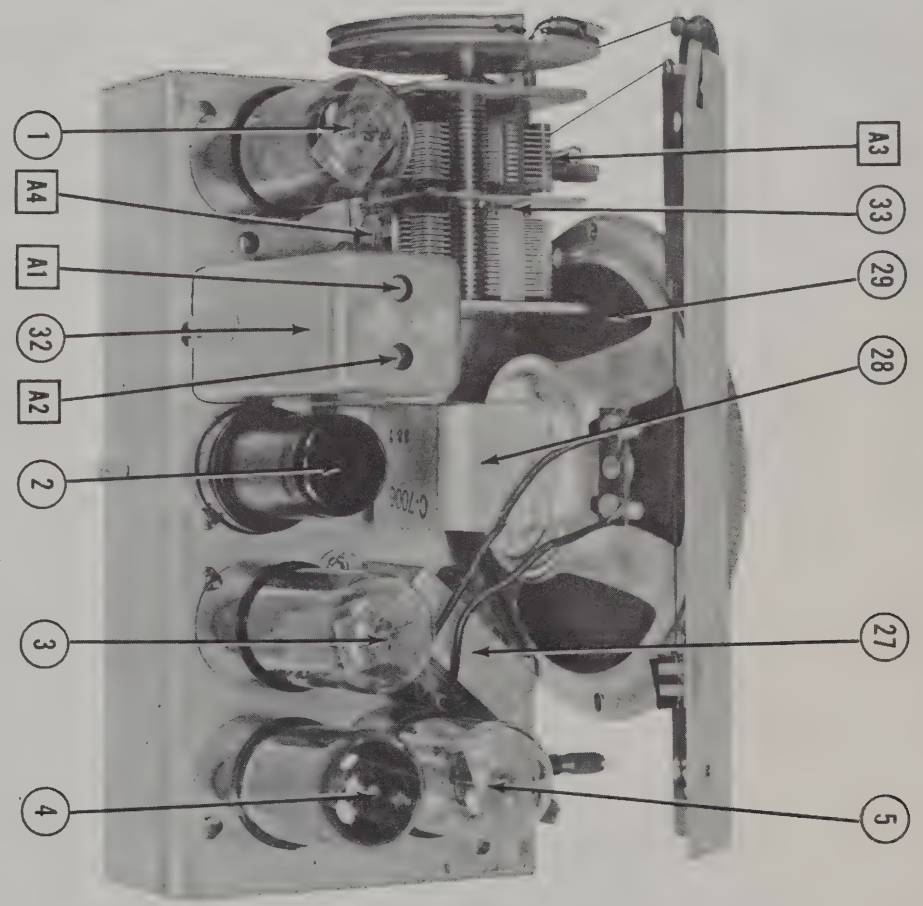
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SPARTON PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
17A	500KΩ	½	A18004-1	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 17A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SPARTON PART No.	IRC PART No.	IDENTIFICATION CODES
15	20KΩ	¼	C8000-A12S203	BTS-22K	Red-Blk.-Or. Oscillator Grid
19	2.2 Meg.	¼	C8000-A12N225	BTS-2.2 Meg	Red-Red-Grn. AVC Network
20	6800Ω	½	C8000-B12S682	BTS-6800	Blue-Gray-Red IF Plate Load-See Note
21	33KΩ	¼	C8000-A12N333	BTS-33K	Or.-Or.-Or. Diode RF Filter
22	5.6 Meg.	¼	C8000-A12N565	BTS-5.6 Meg	Grn.-Blue-Grn. AF Grid
23	470KΩ	½	C8000-B12S474	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
24	1 Meg.	¼	C8000-A12N105	BTS-1 Meg.	Br.-Blk.-Grn. Output Grid
25	150Ω	½	C8000-B12S151	BW-½-150	Br.-Grn.-Br. Output Cathode
26	1500Ω	1	C8000-C12N152	BTA-1500	Br.-Grn.-Red Filter

Note-Some models use two 6800Ω resistors in series in this application. Replacement same as above.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		SPARTON PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
27	2100Ω	3.0Ω	215Ω tapped @ 10Ω	.7Ω	B-6006	A-3876*		A-2928*	*Add extra filter to reduce hum level.

SPEAKER

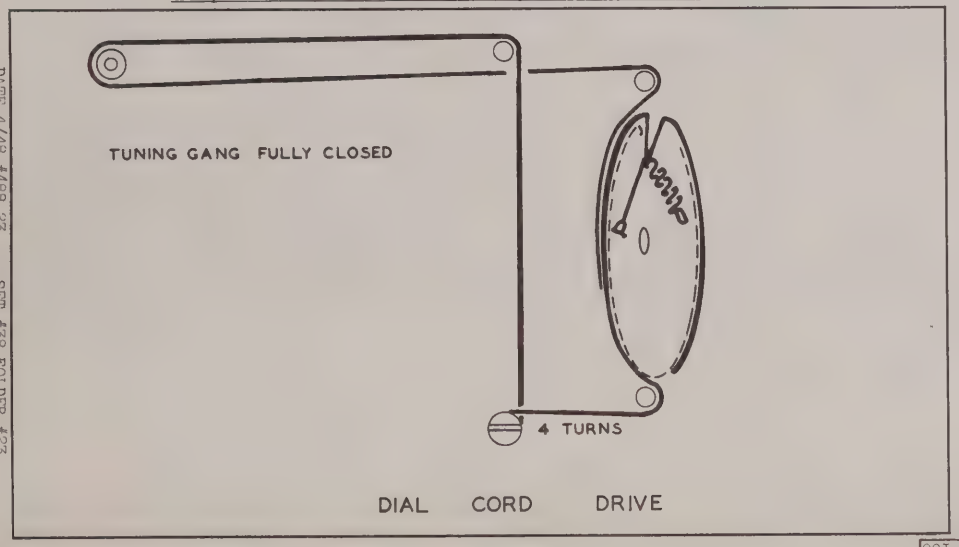
ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			SPARTON PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD RES.	VC IMP.		ST-107		
28	PM	3.0Ω	C-7006	Mod. P5-V	5A1	
	CONE DIA.	VC DIA.				
29	4-3/4"	1/2"				

R F COILS

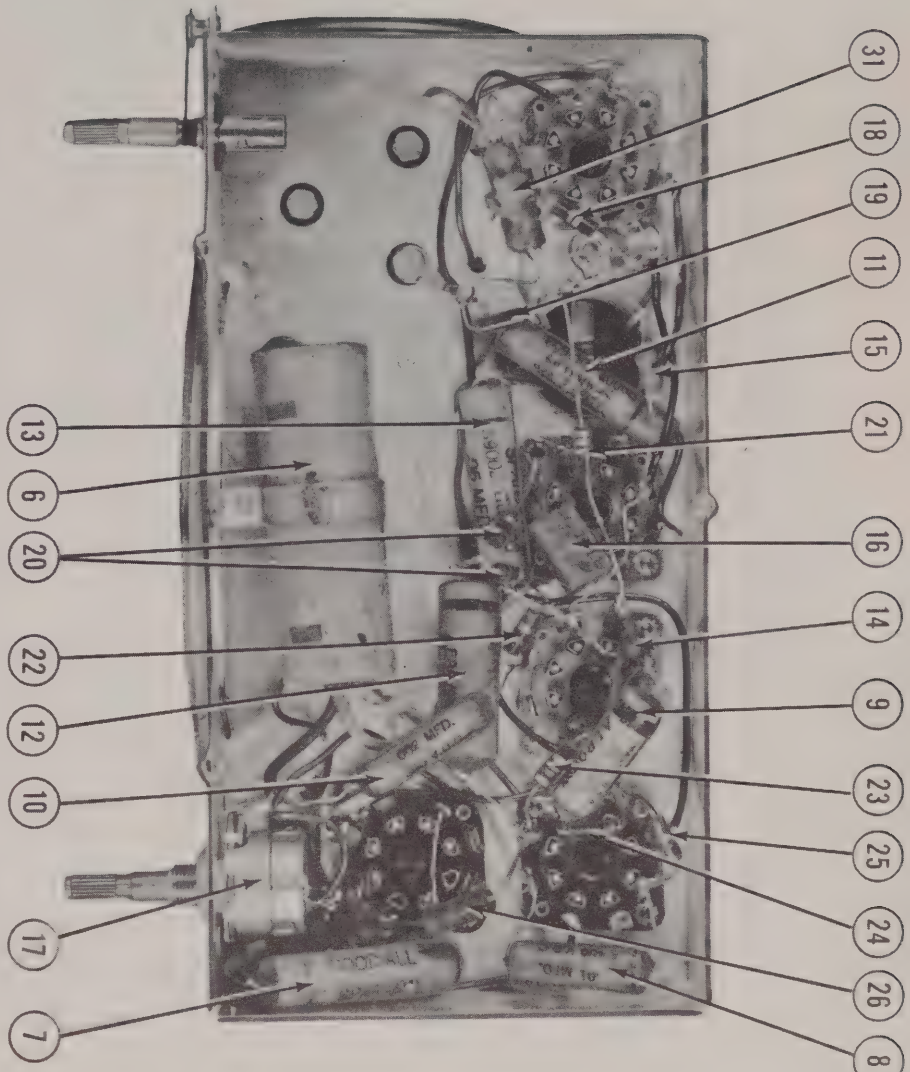
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	SPARTON PART No.	MEISSNER PART No.	
30	Loop Ant.		1Ω	B22006		
31	Osc. Coil	.6Ω	4.8Ω	A5028-1	14-1060†	†Add 50MMFD from osc. grid to high side tuning cap.
32	IF Trans.	11Ω	13Ω	A5029		

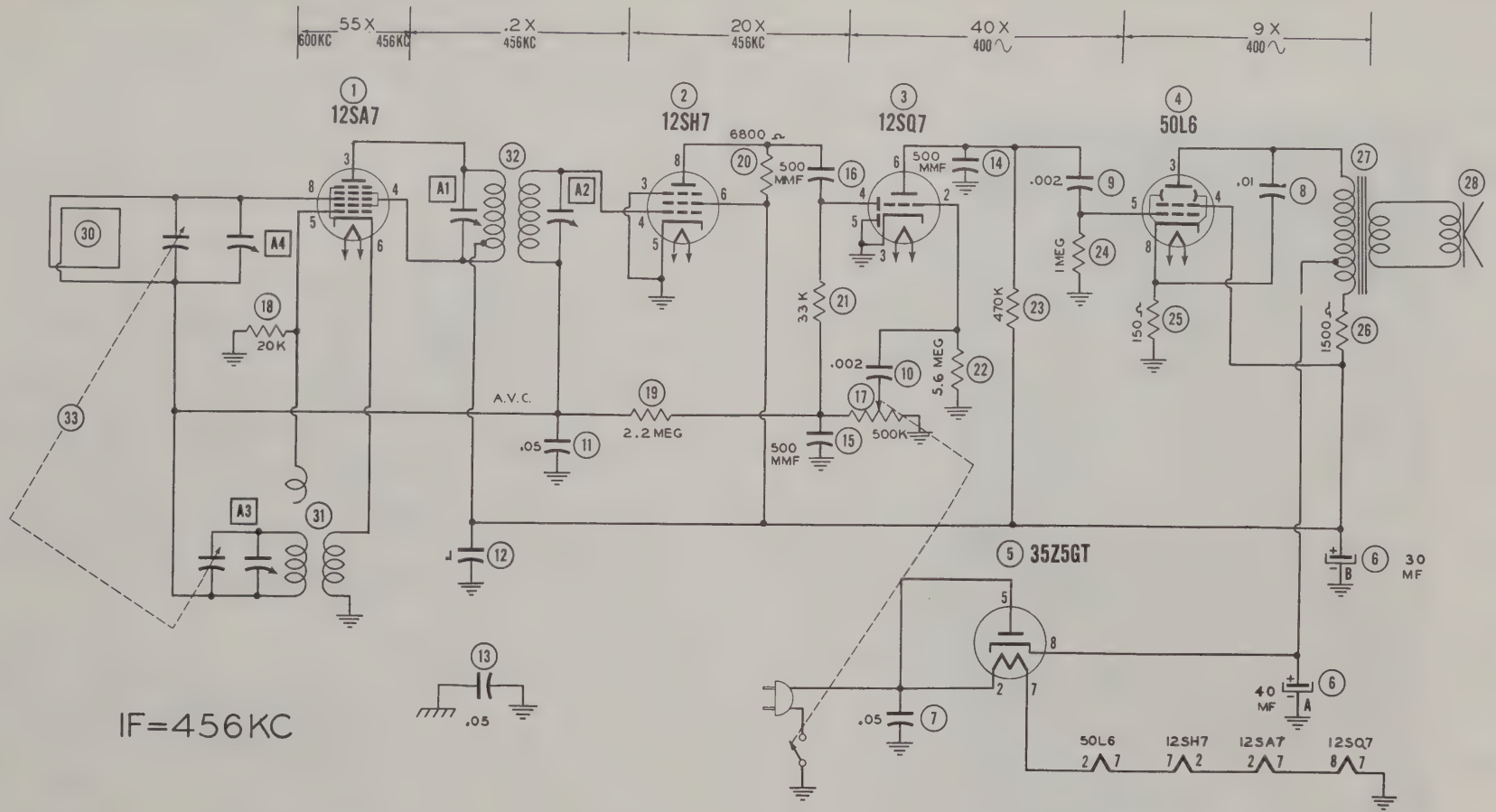
MISCELLANEOUS

ITEM No.	PART NAME	SPARTON PART No.	NOTES
33	2 Gang Var. Cap.	B11004	(22-458MMF, 35-200MMF)
	Dial Pointer	A21002	
	Knob	A41005-3	Black
	"	A41005-2	Ivory



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	0V.	25VAC	100VDC	100VDC	-9VDC§	0V.	12VAC	-.4VDC
2	12SH7	0V.	25VAC	0V.	-.4VDC	0V.	100VDC	37VAC	37VDC
3	12SQ7GT	0V.	-.5VDC	0V.	-.3VDC	0V.	44VDC	0V.	12VAC
4	50L6GT	0V.	85VAC	125VDC	100VDC	0V.	0V.	37VAC	6VDC
5	35Z5GT	0V.	117VAC	111VAC	0V.	117VAC	132VDC	85VAC	133VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7GT	INF.	25Ω	200KΩ	200KΩ	20KΩ	.6Ω	12Ω	2.7 Meg
2	12SH7	INF.	25Ω	0Ω	2.7 Meg.	0Ω	200KΩ	38Ω	207KΩ
3	12SQ7GT	INF.	5.6 Meg.	0Ω	530KΩ	0Ω	670KΩ	0Ω	12Ω
4	50L6GT	INF.	85Ω	200KΩ	200KΩ	1 Meg.	0Ω	38Ω	150Ω
5	35Z5GT	INF.	120Ω	110Ω	INF.	120Ω	200KΩ	85Ω	200KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

488-23

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

STEWART-WARNER MODEL 9002-A

TRADE NAME	Stewart-Warner, Models 9002-A, B, P, R
MANUFACTURER	Stewart-Warner Corp., 1826 Diversey Pkwy., Chicago, Ill.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 12SK7 RF Amp., 12SA7 Converter, 12SF7 IF-Det.-AVC, 12SK7 AF Amp., 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1650KC RATING .25 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

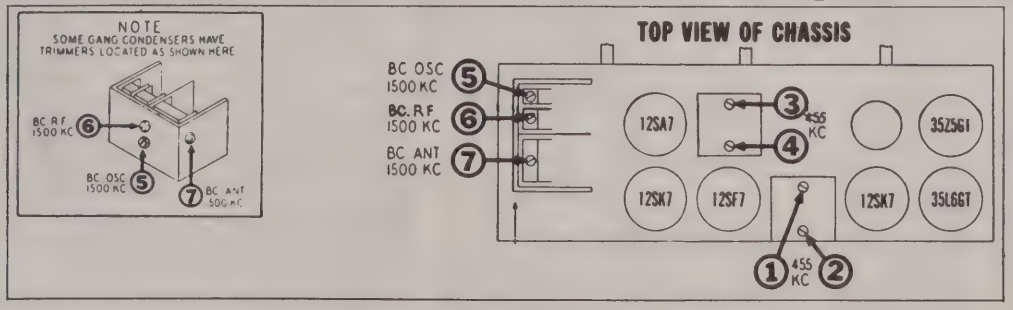
To set pointer turn tuning cap. fully closed and set pointer to 1st calibration mark at left end of dial backplate.

Use isolation transformer if available. If not connect a .25 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	200MMFD	High side to Pin 8 (grid) 12SA7. Low side to B-.	455KC	Any point of non-interference.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output in order given and repeat.
2	200MMFD	High side to ext. ant. clip. Low side to B-.	1500KC	1st calibration mark at right end of dial backplate.	"	A5	Adjust for maximum output.
3	200MMFD	"	"	Tune for maximum output.	"	A6,A7	" " " "



STEWART-WARNER MODELS
9002-A, 9002-B, 9002-P, 9002-R

STEWART-WARNER MODELS
9002-A, 9002-B, 9002-P, 9002-R

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."

"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

STEWART-WARNER MODEL 9002-A

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: STEWART-WARNER PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	12SK7	12SK7	8N	
2	Converter	12SA7	12SA7	8R	
3	IF-Det.-AVC	12SF7	12SF7	7AZ	
4	AF Amp.	12SK7	12SK7	8N	
5	Power Output	35L6GT	35L6GT	7AC	
6	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: STEWART-WARNER PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	40	150	500256	EL-24	AF88D	UP4215	DY-4020-150	■ Filter
B	20	150						▲ "
8	.05	400	502157	TC-15	484-05	DT4S5	ST-4-05	Rectifier Bypass
9	.02	400	502152	TC-12	484-02	DT4S2	ST-4-02	Feedback
10	.01	400	502151	TC-11	484-01	DT4S1	ST-4-01	Output Plate Bypass
11	.004	600	502156	TC-24	684-004	DT6D4	ST-6-004	Audio Coupling
12	.05	200	502153	TC-15	484-05	DT2S5	ST-4-05	AF Plate Decoupling
13	.0008	400	502470	MS-38	1468-00075	1W5T8	MO.3-38	Tone Compensation
14	.002	400	502453	TC-22	484-002	DT4D2	ST-4-002	Audio Coupling
15	.25	200	502262	TC-2	484-.25	DT2P25	ST-2-25	Conv. Screen Bypass
16	.2	200	502158	TC-2	484-.2	DT2P25	ST-2-25	Line Isolation
17	.05	400	502157	TC-15	484-05	DT4S5	ST-4-05	AVC Filter
18	110	500	502160	1FM-31	1468-0001	5W5T1	MO.5-31	AF Plate Bypass
19	110	500	502160	1FM-31	1468-0001	5W5T1	MO.5-31	Diode RF Filter
20	50	500	502159	1FM-45	1468-00005	5W5Q5	MO.5-45	Osc. Grid Cap.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: STEWART-WARNER PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
21A	500KΩ	½	502145	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 21A per instructions
C	Switch		" "	41	SW-A	" " " " "

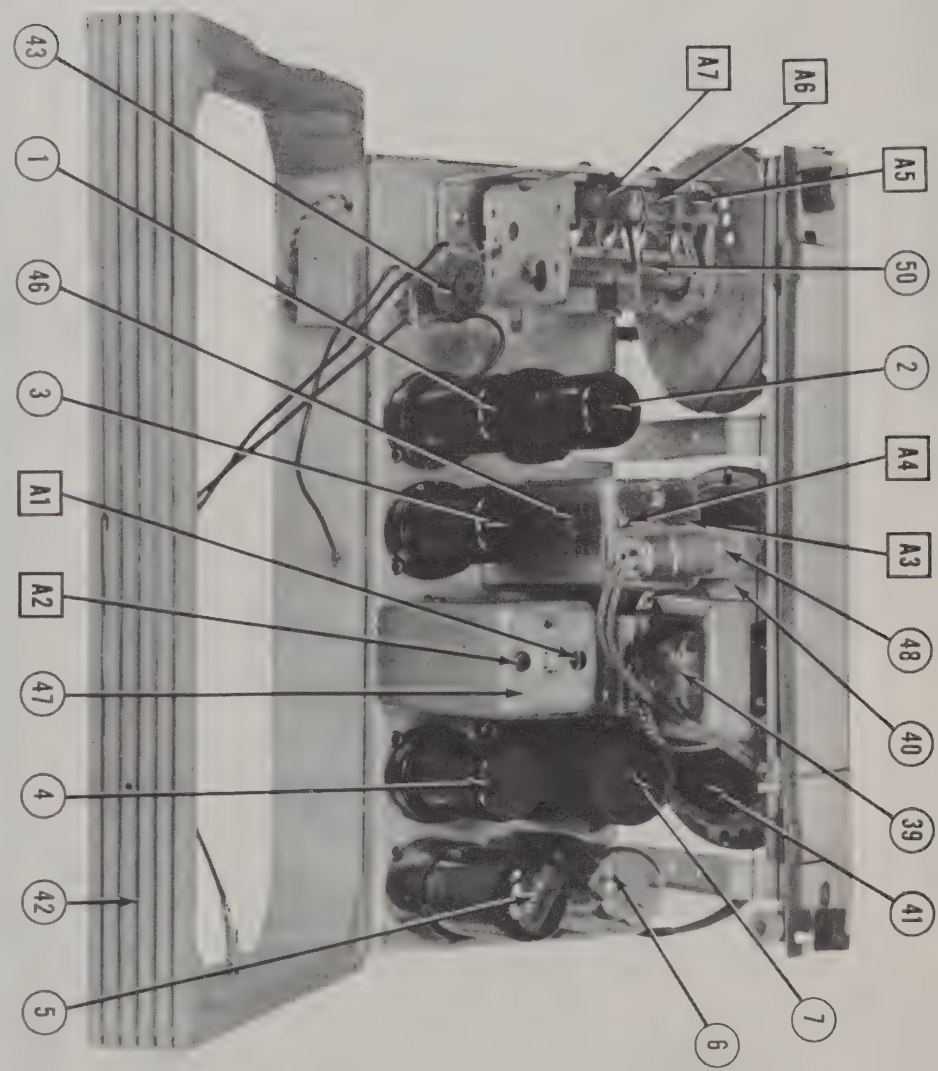
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: STEWART-WARNER PART No.	IRC PART No.	IDENTIFICATION CODES
22	220Ω	¼	502125	BW-¼-220	Red-Red-Br. RF Cathode
23	22KΩ	¼	502130	BTS-22K	Red-Red-Or. Oscillator Grid
24	4700Ω	¼	502291	BTS-4700	Yl.-Vi.-Red Converter Screen Decoupling
25	3.3 Meg.	¼	502269	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
26	47KΩ	¼	502131	BTS-47K	Yl.-Vi.-Or. Diode RF Filter
27	47Ω	¼	502264	BW-¼-47	Yl.-Vi.-Blk. IF Cathode
28	10 Meg.	¼	502136	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
29	2200Ω	¼	502128	BTS-2200Ω	Red-Red-Red AF Cathode
30	2.2 Meg.	¼	502135	BTS-2.2 Meg.	Red-Red-Grn. AF Screen Dropping
31	220KΩ	¼	502133	BTS-220K	Red-Red-Yl. AF Plate Load
32	220KΩ	¼	502133	BTS-220K	Red-Red-Yl. AF Plate Decoupling
33	470KΩ	¼	502134	BTS-470K	Yl.-Vi.-Yl. Output Grid
34	130Ω	¼	502138	BW-¼-120	Br.-Or.-Br. Output Cathode
35	1500Ω	1	502469	BTA-1500	Br.-Grn.-Red Filter
36	33Ω	½	502574	BW-½-33	Or.-Or.-Blk. Rectifier Ballast
37	390Ω	¼	502140	BW-¼-390	Or.-White-Blk. Pilot Light Shunt
38	220KΩ	¼	502133	BTS-220K	Red-Red-Yl. Line Isolation

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: STEWART-WARNER PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
39	2000Ω	3.9Ω	225Ω tapped @ 12Ω	.5Ω	502213	A-3876*		A-2928*	*Bend mounting tabs down, file out slots and mount on original bracket. Add extra filter to reduce hum level.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: STEWART-WARNER PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-107†		
40A B	PM	3.9Ω	502998 502208	Mod. P5-V	5A15†	†Fabricate new mounting bracket. Alternate
	CONE DIA.	VC DIA.				
41	4-3/4"	1/2"				

R F COILS

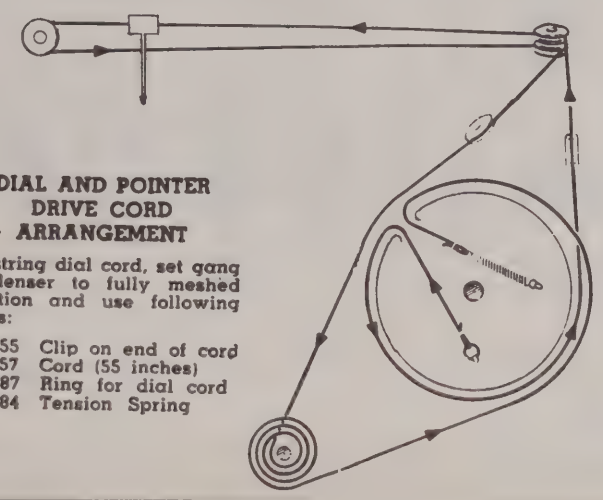
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: STEWART-WARNER PART No.	MEISSNER PART No.
42	Loop Ant.		0Ω	502246	
43	Ant. Coupl.	.7Ω	.3Ω	502121	
44	BC RF Coil	77Ω	7.5Ω	502142	
45	Osc. Coil	1.5Ω	11Ω	502198	14-1060
46	Input IF	20Ω	20Ω	502102	16-6658
47	Output IF	19Ω	19Ω	502103	16-6660

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: STEWART-WARNER PART No.		INSTALLATION NOTES
48	Bayonet	6-8	0.15	Brown	502473		Type 47

MISCELLANEOUS

ITEM No.	PART NAME	STEWART-WARNER PART No.	NOTES
49	Switch	500546	Tone
50	3 Gang Var. Cap.	502123	(28-465MMF, 18-256MMF, 11-103MMF)
	Dial Scale	502223	Glass (Model 9002-A)
	" "	502224	" (Model 9002-B)
	" "	502691	" (Model 9002-P,R)
	Dial Pointer	502367	(Models 9002-A,B)
	" "	502690	(" 9002-P,R)

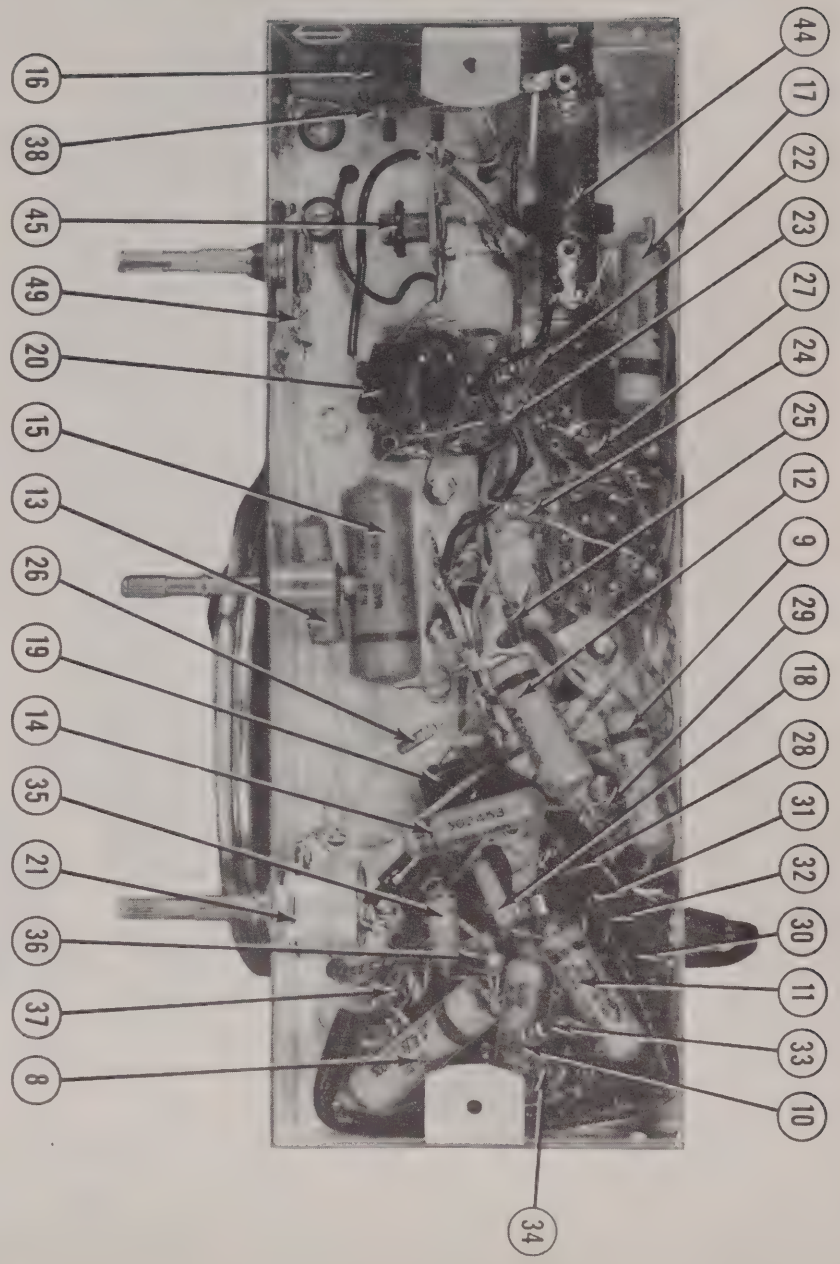


DIAL AND POINTER DRIVE CORD ARRANGEMENT

To string dial cord, set gang condenser to fully meshed position and use following parts:

114955 Clip on end of cord
117057 Cord (55 inches)
119087 Ring for dial cord
161384 Tension Spring

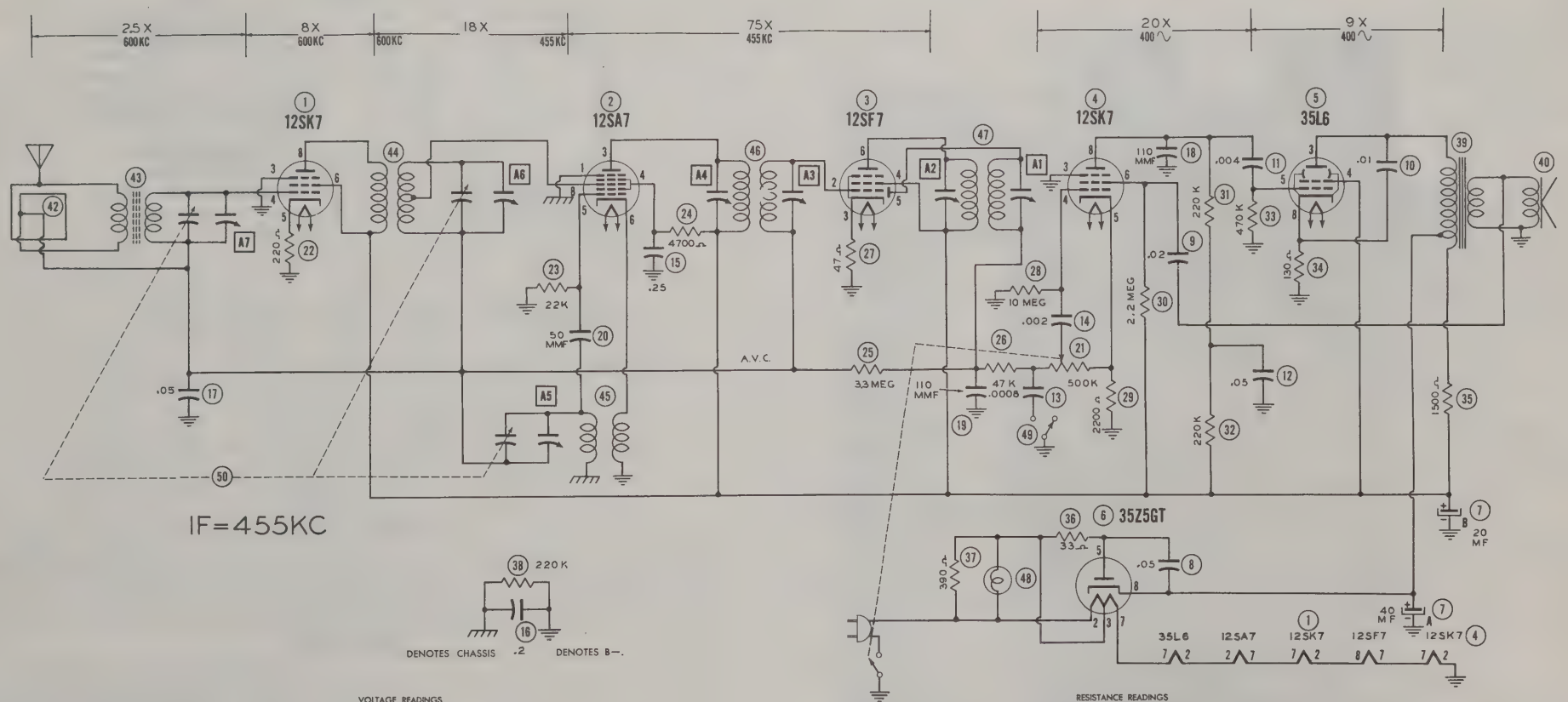
CHASSIS—BOTTOM VIEW



DATE 4/48-#488-24 SET #38-FOLDER #24

STEWART-WARNER MODEL 9002-A

STEWART-WARNER MODEL 9002-A



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SK7	0V.	25VAC	0V.	-1.1VDC	1.4VDC	82VDC	39VAC	82VDC
2	12SA7	0V.	50VAC	82VDC	60VDC	-5.5VDC§	0V.	39VAC	-.4VDC
3	12SF7	0V.	-1.1VDC	.5VDC	82VDC	0V.	82VDC	12VAC	25VAC
4	12SK7	0V.	0V.	0V.	-.4VDC	.4VDC	8.5VDC	12VAC	17VDC
5	35L6GT	0V.	50VAC	172VDC	82VDC	0V.	0V.	84VAC	4.4VDC
6	35Z5GT	0V.	117VAC	113VAC	120VDC	113VAC	0V.	84VAC	120VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SK7	220KΩ	23Ω	0Ω	4 Meg.	220Ω	70KΩ	36Ω	70KΩ
2	12SA7	220KΩ	47Ω	70KΩ	75KΩ	22KΩ	1.5Ω	36Ω	4 Meg.
3	12SF7	220KΩ	4 Meg.	50Ω	70KΩ	550KΩ	70KΩ	11Ω	23Ω
4	12SK7	220KΩ	0Ω	0Ω	10 Meg.	2.2KΩ	2.2 Meg.	11Ω	500KΩ
5	35L6GT	220KΩ	47Ω	70KΩ	70KΩ	470KΩ	INF.	79Ω	125Ω
6	35Z5GT	INF.	110Ω	105Ω	70KΩ	135Ω	0Ω	79Ω	70KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

488-24

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

TELE-TONE MODELS 150, 161, 162, 167, 168, 171, 174 (Ch. Series "T")

TELE-TONE MODEL 150

TRADE NAME	Tele-Tone, Models 150, 161, 162, 167, 168, 171, 174 (Ch. Series "T")
MANUFACTURER	Tele-Tone Radio Co., 540 W. 58th St., New York 19, N. Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (Four)	Types 12BE6 Converter, 12AT6 Det.-AVC-AF. 50B5 Power Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1700KC RATING .23 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to rear stator of tuning capacitor. Low side to B-.	455KC	Tuning capacitor fully open.	Across voice coil	A1,A2	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2	200 MMFD	High side to junction of Ant. Hank & Ant. Coil (28). Low side to B-.	1700KC	Tuning capacitor fully open.	Across voice coil	A3	Adjust for maximum output.
3	200 MMFD	High side to junction of Ant. Hank & Ant. Coil (28). Low side to B-.	1500KC	Tune for maximum output.	Across voice coil	A4	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."

"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TELE-TONE MODEL 150

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		TELE-TONE PART No.	STANDARD REPLACEMENT		
1	Converter	12BE6	12BE6	7CH	
2	Det.-AVC-AF	12AT6	12AT6	7BT	
3	Power Output	50B5	50B5	7BZ	
4	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	TELE-TONE PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
5A	20	150	CE-13	TA-240	PRS-A40302	EZ4215C	DSB-403020-150	Filter - Red
B	40	150						" Green
C	20	150		TA-25				Cathode Bypass - Blue
6	.02	400	CP203-1	TC-12	484-02	DT4S2	ST-6-02	Rectifier Bypass
7	.02	400	CP203-1	TC-12	484-02	DT4S2	ST-4-02	Output Plate Bypass
8	.005	600	CP502-3	TC-25	684-005	DT6D5	ST-6-005	Audio Coupling
9	.002	400	CP202-2	TC-22	484-002	DT6D2	ST-6-002	" "
10	.05	200	CP503-3	TC-15	484-05	DT2S5	ST-4-05	AVC Filter
11	.01	150	CP103-2	TC-11	484-01	DT2S1	ST-4-01	Conv.Cathode Bypass
12	.05	200	CP503-3	TC-15	484-05	DT2S5	ST-4-05	Line Isolation
13	150	500	CM151-1	1FM-315	1468-00015	5W5T15	MO.5-315	Diode RF Filter

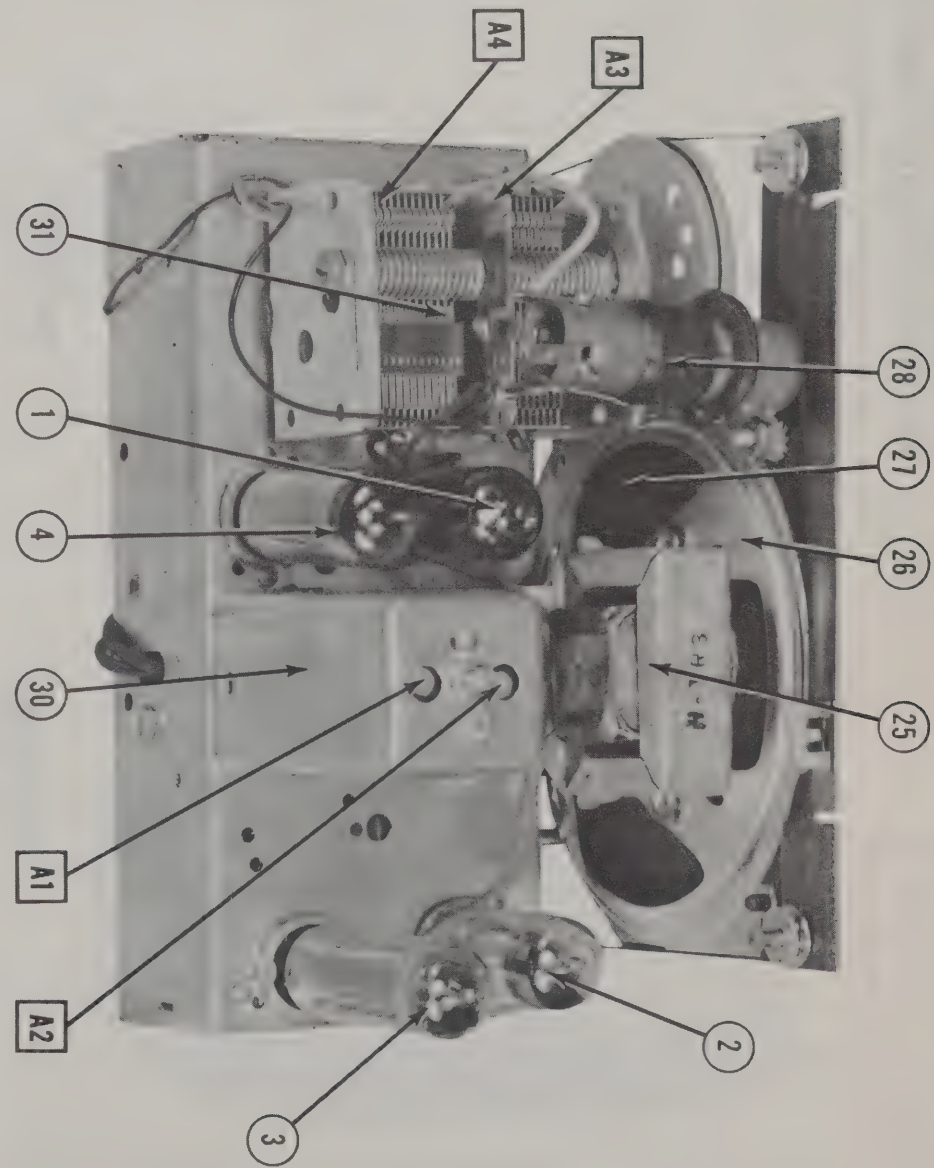
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	TELE-TONE PART No.	IRC PART No.	CLAROSTAT PART No.	
14	1 Meg.	½	H-VC-2			Volume Control and Switch

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	TELE-TONE PART No.	IRC PART No.	
15	22KΩ	½	RC223-1	BTS-22K	Red-Red-Or.- Oscillator Grid
16	82Ω	½	RC820-2	BW-½-82	Gray-Red-Blk. Converter Cathode
17	2.2 Meg.	½	RC225-1	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
18	100KΩ	½	RC104-1	BTS-100K	Br.-Blk.-Yl. Diode RF Filter
19	10 Meg.	½	RC106-1	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
20	330KΩ	½	RC334-1	BTS-330K	Or.-Or.-Yl. AF Plate Load
21	470KΩ	½	RC474-1	BTS-470K	Yl.-Vi.-Yl. Output Grid
22	150Ω	½	RC151-1	BW-½-150	Br.-Grn.-Br. Output Cathode
23	2200Ω	1	RC222-4	BTA-2200	Red-Red-Red Filter
24	33Ω	2	RC330-8	BW-2-33	Or.-Or.-Blk. Line Dropping

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA TELE-TONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
25A	3200Ω	3.5Ω	250Ω	.8Ω	TR-3	A-3876*	T22S45*	A-2928*	*Bend mounting tabs down, file out slots and mount on original bracket.
B					TR-6				Alternate Transformer

SPEAKER

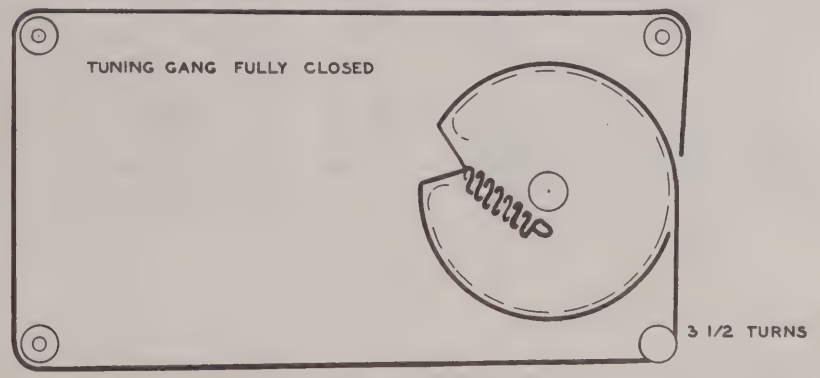
ITEM No.	RATINGS		REPLACEMENT DATA TELE-TONE PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.				
26A	PM	3.5Ω	H-SP3			
B			SP40-6			Alternate Speaker
	CONE DIA.	VC DIA.				
27	4 in.	½ in.				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA TELE-TONE PART No.	MEISSNER PART No.	
28	Ant.Coil	45Ω	3.8Ω	LA-3	14-1056	
29	Osc.Coil	.4Ω	5.5Ω	LC-1	14-1060†	†Add 50 MMFD from Osc. Grid to high side tuning capacitor.
30	IF Trans.	23Ω	23Ω	LF-20		

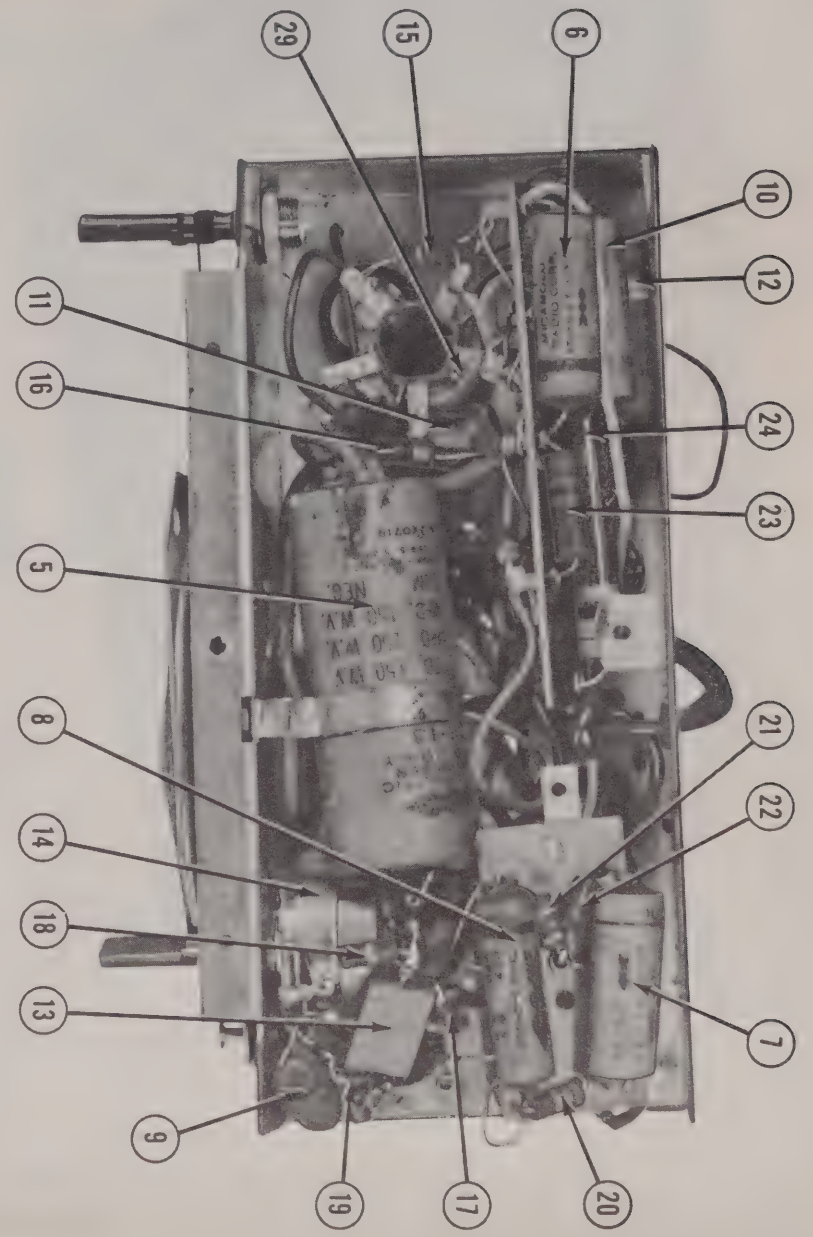
MISCELLANEOUS

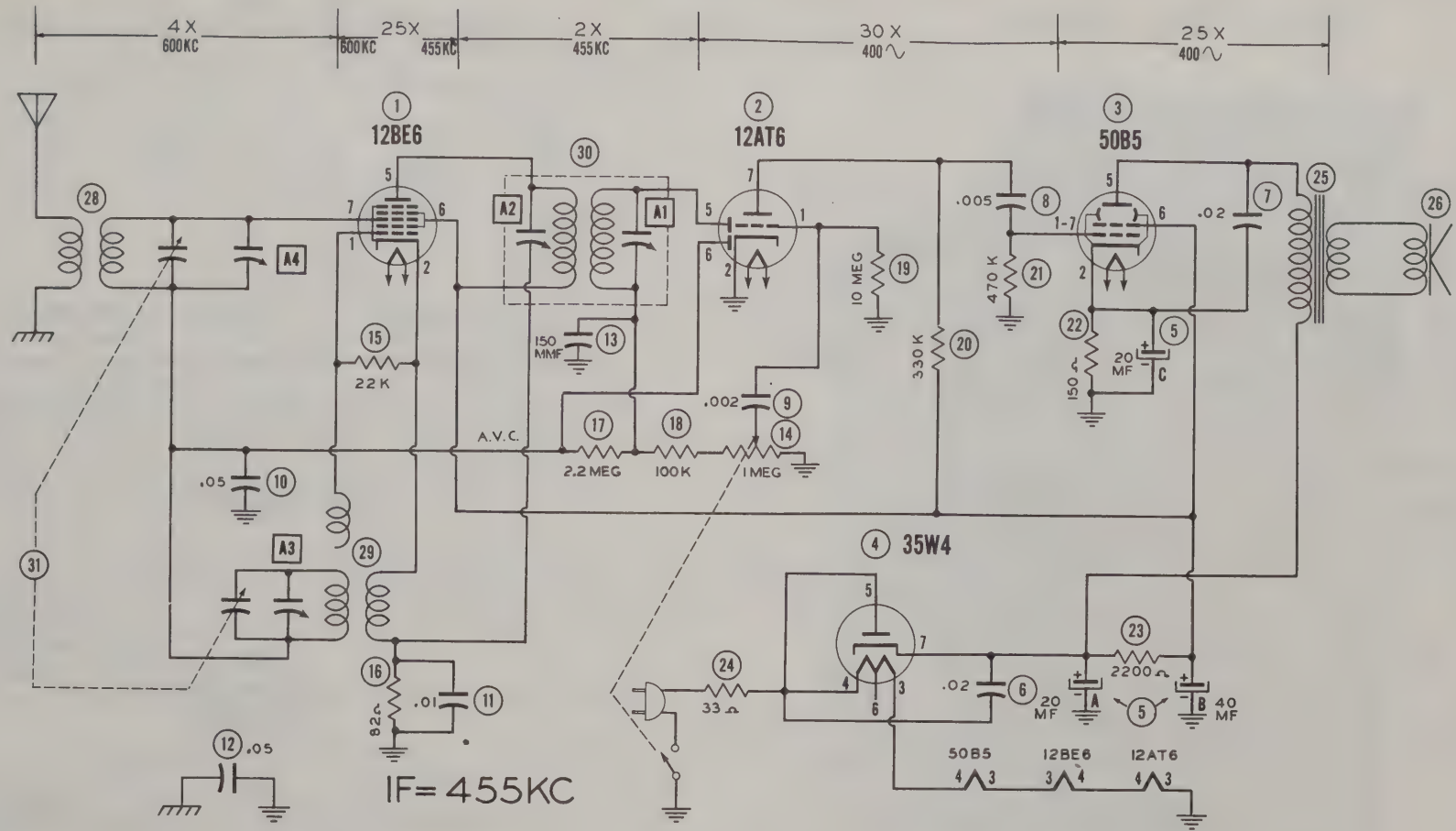
ITEM No.	PART NAME	TELE-TONE PART No.	NOTES
31	2 Gang Var.Cap.	CV-10	(35-483 MMFD, 25-187 MMFD)
	Dial Pointer	PN-3	



DIAL CORD DRIVE

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	-7.1VDC§	.82VDC	27.5VAC	13VAC	97VDC	97VDC	-.6VDC
2	12AT6	-1VDC	0V.	0V.	13VAC	-.6VDC	-.6VDC	45VDC
3	50B5	0V.	6.5VDC	27.5VAC	75VAC	113VDC	97VDC	0V.
4	35W4	0V.	0V.	75VAC	110VAC	110VAC	102VAC	122VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	22KΩ	85Ω	25Ω	13Ω	32KΩ	32KΩ	3.5 Meg.
2	12AT6	10 Meg.	0Ω	0Ω	13Ω	1.1 Meg.	3.5 Meg.	360KΩ
3	50B5	470KΩ	150Ω	25Ω	75Ω	30KΩ	32KΩ	470KΩ
4	35W4	INF.	INF.	75Ω	110Ω	110Ω	100Ω	30KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

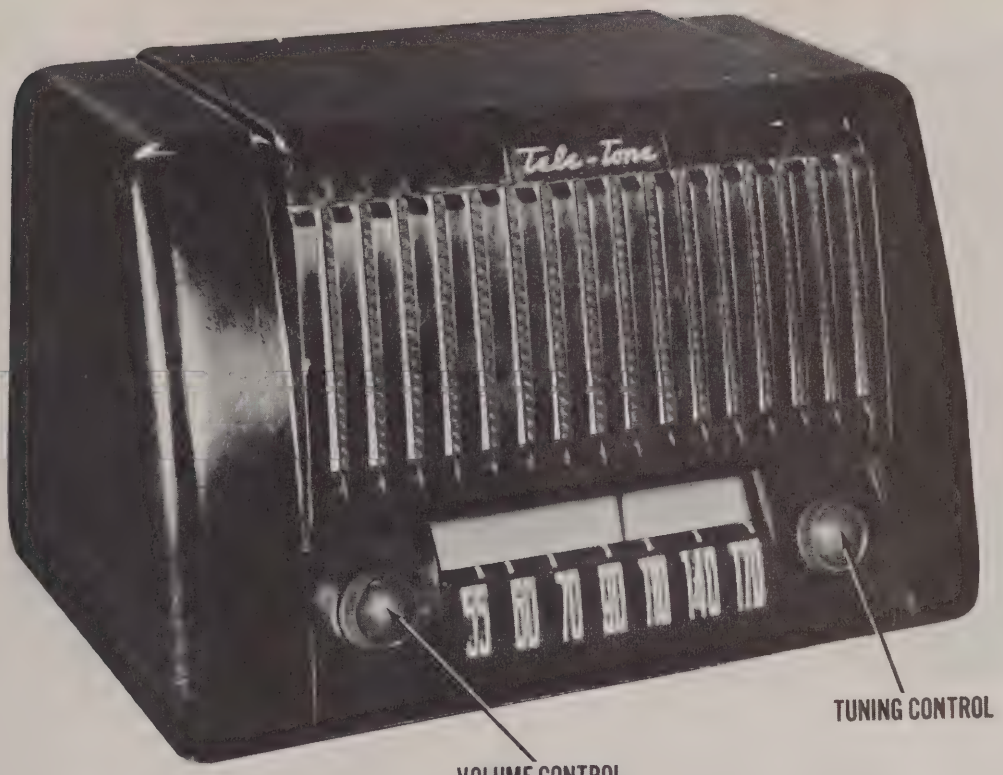
© Howard W. Sams & Co., Inc. 1948

488-25

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

TELE-TONE MODEL 159
(Ch. Series "AA")



TELE-TONE MODEL 159
(Ch. Series "AA")

TELE-TONE MODEL 159

TRADE NAME	Tele-Tone. Model 159 (Ch. Series "AA")
MANUFACTURER	Tele-Tone Radio Co., 540 W. 58th St., New York 19, N. Y.
TYPE SET	AC-DC Operated Superheterodyne Receiver with Loop Antenna
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	110-120 Volts AC-DC
TUNING RANGE—BROADCAST	540-1700KC RATING .23 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to rear stator of tuning capacitor. Low side to B-.	455KC	Tuning capacitor fully open.	Across voice coil	A1,A2 A3,A4	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.
2		Loop	1700KC	Tuning capacitor fully open.	Across voice coil	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		Loop	1500KC	Tune for maximum output.	Across voice coil	A6	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TELE-TONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12BE6	12BE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	12AT6	12AT6	7BT	
4	Power Output	50B5	50B5	7BZ	
5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TELE-TONE PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	20	150	CE-11	TA-220	PRSA150-20	EZ42215	DSB-3X20-150	Filter - Blue
B	20	150			20			" Green
C	20	150		UT-201	PRS150-20			" Red
7	.02	400	CP-203-1	TC-12	484-02	DT4S2	ST-4-02	Rectifier Bypass
8	.02	400	CP-203-1	TC-12	484-02	DT4S2	ST-4-02	Output Plate Bypass
9	.01	400	CP-103-1	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
10	.002	600	CP-202-4	TC-22	684-002	DT6D2	ST-6-002	" "
11	.05	400	CP-503-1	TC-15	484-05	DT4S5	ST-4-05	AVC Filter
12	.05	400	CP-503-1	TC-15	484-05	DT4S5	ST-4-05	Line Isolation
13	220	500	CM-151-1	1FM-32	1468-0002	5W5T2	MO.5-32	Diode RF Filter - Cer.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TELE-TONE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
14A	1 Meg.	½	VC-9	D13-137*	M-63-Z*	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 14A per instructions.
C	Switch		Not Req.	41	SW-A	" " " " "

* Install a 100KΩ Resistor in series with the right hand terminal of the control and the lead connecting to the same terminal of the original control. (Controls viewed from shaft side, terminals down.)

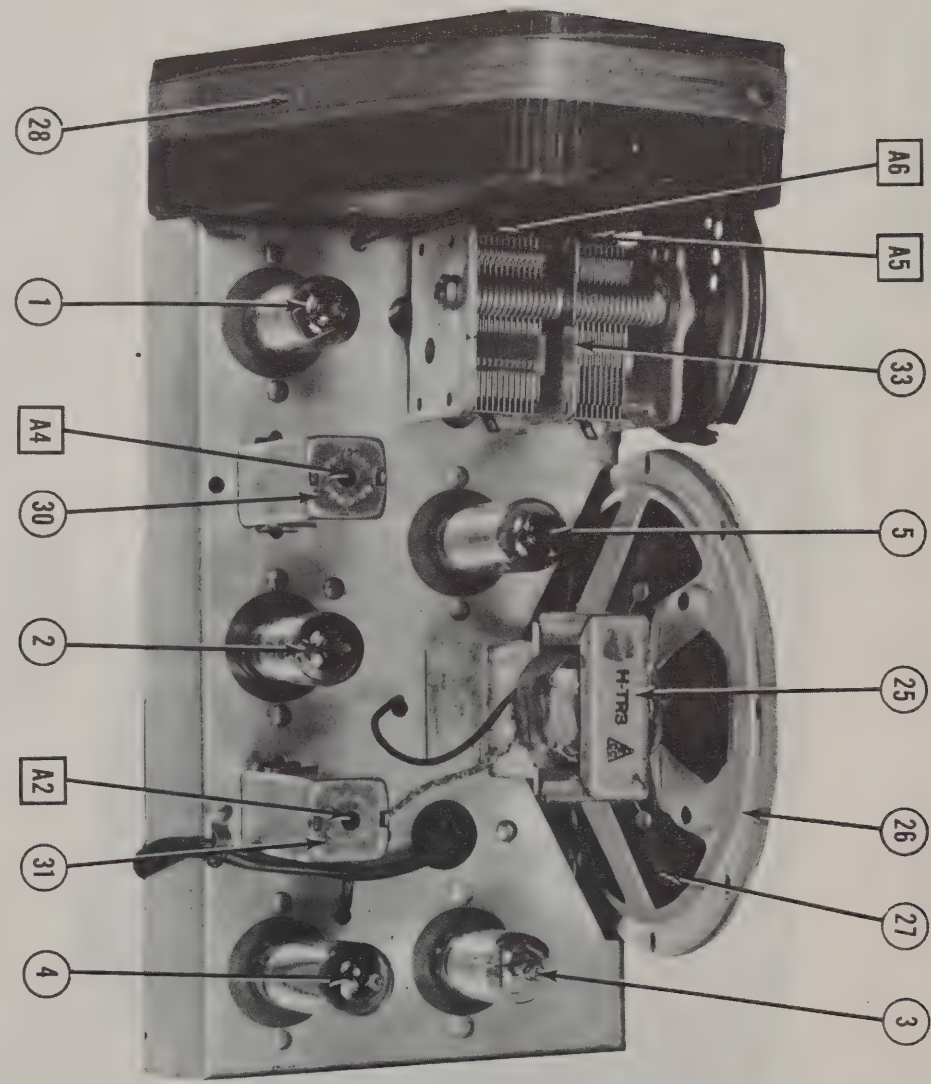
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TELE-TONE PART No.	IRC PART No.	IDENTIFICATION CODES
15	22KΩ	½	RC223-1	BTS-22K	Red-Red-Or. Oscillator Grid
16	150Ω	½	RC151-1	BW-½-150	Br.-Grn.-Br. IF Cathode
17	2.2 Meg.	½	RC225-1	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
18	10 Meg.	½	RC106-1	BTS-10 Meg	Br.-Blk.-Blue AF Grid
19	220KΩ	½	RC224-1	BTS-220K	Red-Red-Yl. AF Plate Load
20	470KΩ	½	RC474-1	BTS-470K	Yl.-Vi.-Yl. Output Grid
21	150Ω	½	RC151-1	BW-½-150	Br.-Grn.-Br. Output Cathode
22	1500Ω	½	RC152-1	BTS-1500	Br.-Grn.-Red Filter
23	150Ω	1	RC151-4	BW-1-150	Br.-Grn.-Br. "
24	18Ω	½	RC180-2	BW-½-18	Br.-Gray-Blk. Surge Limiter

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: TELE-TONE PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	INSTALLATION NOTES
25	2900Ω	3.2Ω	250Ω	.8Ω	H-TR3	A-3876‡	T22S45‡	A-2928‡	‡Bend mounting tabs down, File out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TELE-TONE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-105†		
26A B	PM	3.2Ω	SP-50.1 SP-51-1	Mod.P5-X	5A1	†Drill and tap magnet frame. Alternate Speaker.
	CONE DIA.	VC DIA.				
27	4-5/8"	¾"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TELE-TONE PART No.	MEISSNER PART No.	
28	Loop Ant.		2.2Ω	LP-1A		
29	Osc.Coil	.4Ω	5.5Ω	LC-1	14-1060#	#Add 50 MMFD from Osc. grid to high side tuning cap.
30	Input IF	20Ω	20Ω	LF-14	16-6658	
31	Output IF	20Ω	20Ω	LF-14	16-6660	

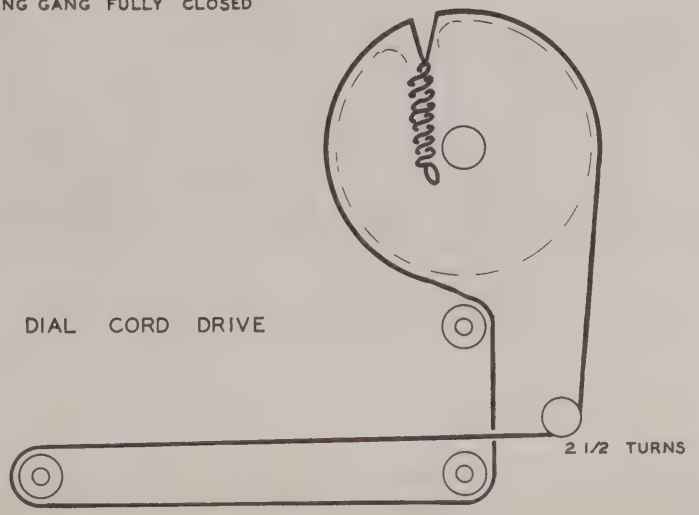
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					TELE-TONE PART No.		
32	Bayonet	6-8V	0.15A	Brn.	BU-47		Type 47

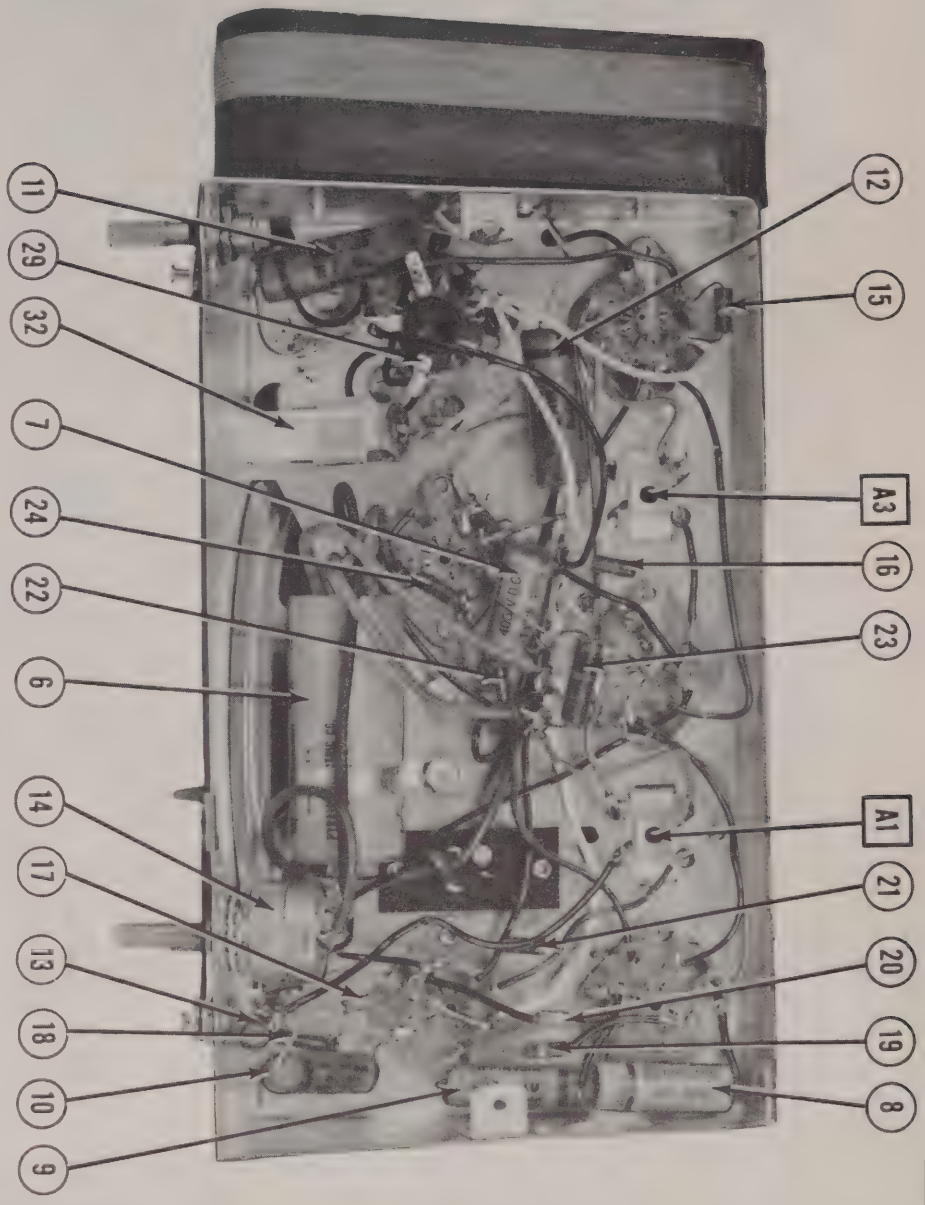
MISCELLANEOUS

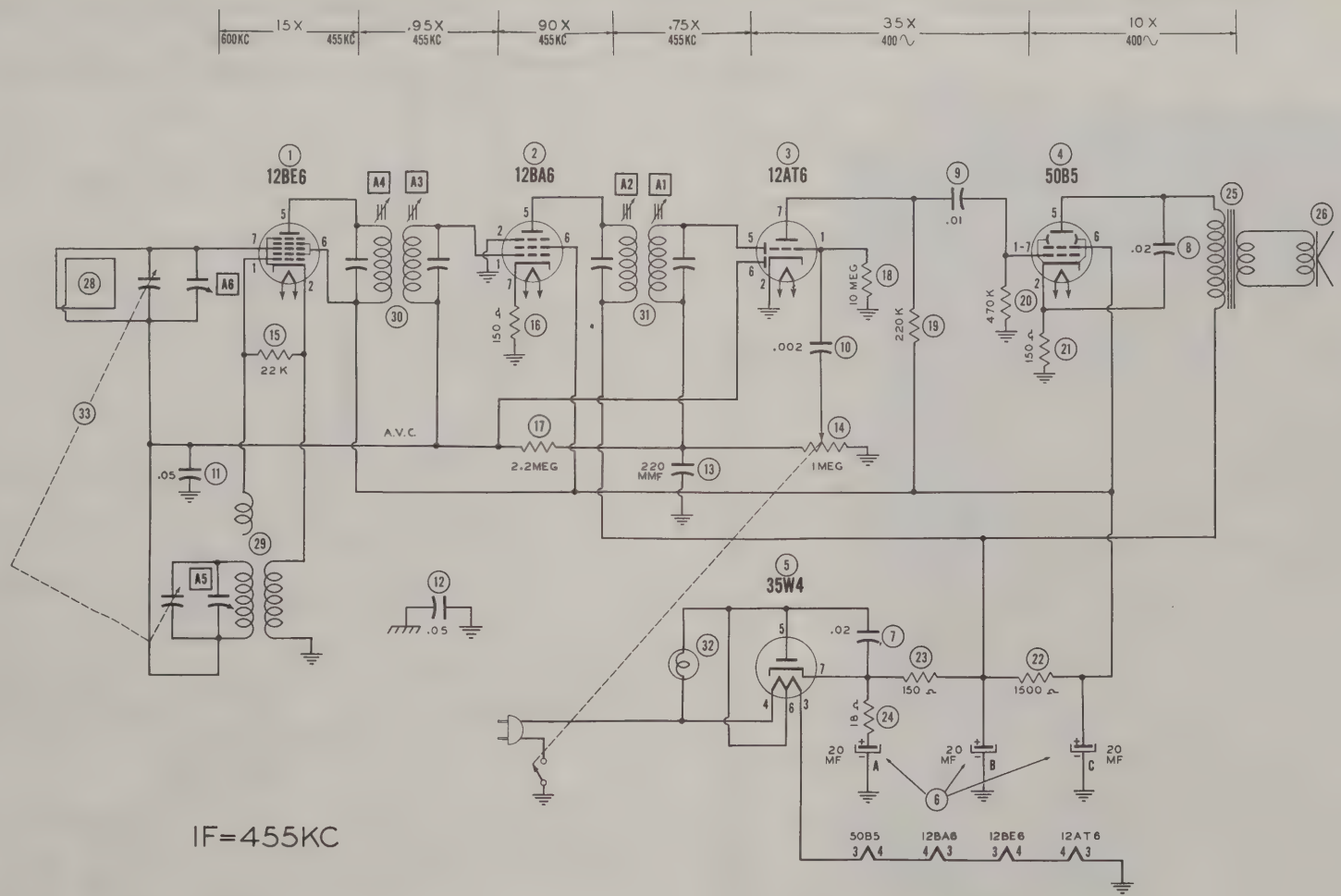
ITEM No.	TELE-TONE PART NAME	PART No.	NOTES
33	2 Gang Var.Cap.	CV-13	(31-462MMFD, 29-192 MMFD)
	Dial Pointer	PN-12	

TUNING GANG FULLY CLOSED



CHASSIS—BOTTOM VIEW





IF=455KC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	-6VDC§	0V.	25VAC	12VAC	92VDC	92VDC	-.5VDC
2	12BA6	-.5VDC	0V.	25VAC	37.5VAC	113VDC	92VDC	1.1VDC
3	12AT6	-.6VDC	0V.	0V.	12VAC	-.5VDC	-.5VDC	47VDC
4	50B5	0V.	5.2VDC	86VAC	37.5VAC	105VDC	92VDC	0V.
5	35W4	123VDC	0V.	86VAC	117VAC	113VAC	113VAC	123VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	22KΩ	.4Ω	24Ω	13Ω	400KΩ	400KΩ	3.2 Meg.
2	12BA6	3.2 Meg.	0Ω	24Ω	36Ω	400KΩ	400KΩ	150Ω
3	12AT6	10 Meg.	0Ω	0Ω	13Ω	1 Meg.	3.2 Meg.	620KΩ
4	50B5	470KΩ	150Ω	90Ω	36Ω	400KΩ	400KΩ	470KΩ
5	35W4	400KΩ	INF.	90Ω	120Ω	118Ω	118Ω	400KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

488-26

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

TEMPLE MODEL G-724

TRADE NAME	Temple, Model G-724
MANUFACTURER	Templetone Radio Mfg. Corp., Garfield Ave., New London, Conn.
TYPE SET	AC-DC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (SEVEN)	Types, 6SB7Y Converter, 12SG7 1st IF Amp., 12SG7 2nd IF Amp., 7A6 FM Ratio Det., 12SQ7GT AM Det.-AVC-AF, 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-125 Volts AC or 120 Volts DC — RATING .33 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1620KC — FREQ. MOD. 87.6-108.4MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

With receiver out of cabinet turn tuning cap. fully closed and mark position of pointer. From this point on the dial backplate measure off and mark the following distances: 1-5/32", 1-3/4", 5-13/16" and 6-5/8" these are 600KC, 92MC, 106MC and 1550KC reference marks referred to in alignment Steps below.

Use isolation transformer if available. If not, connect a .1 MFD capacitor in series with low side of signal generator and chassis.

Use insulated alignment screwdriver for all adjustments.

AM IF ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to rear AM stator of tuning cap. Low side to chassis.	455KC	BC (clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3	Adjust for maximum output If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation.

FM ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

If a VTVM is not available a 20KΩ per volt DC voltmeter may be used as an output indicator.

In Step 3 connect 2 100KΩ resistors in series from Point A to chassis. The values of these two resistors must be within 1% of each other. The junction of these 2 resistors is Point B. (See schematic)

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
2	.01 MFD	High side to Pin 4 (grid) 12SG7 2nd IF Tube (3). Low side to chassis.	10.7MC (unmodulated)	FM (counter clock-wise)	Tuning cap. fully open.	DC probe to Point A. Common to chassis	A4	Adjust for maximum deflection.
3	.01 MFD	"	"	"	"	DC probe to Point C. Common to B. (See pre-alignment notes)	A5	Adjust for zero deflection
4	.01 MFD	"	10.4MC	"	"	DC probe to Point A. Common to chassis	A6	Adjust for maximum deflection.
5	.01 MFD	"	11.0MC	"	"	"	A7	Adjust for maximum deflection. Repeat Steps 3, 4 and 5 until no further improvement can be made making Step 3 last adjustment. Disconnect 2 100KΩ resistors.
6	.01 MFD	High side to Pin 4 (grid) 12SG7 1st IF Tube (2). Low side to chassis.	10.7MC	"	"	"	A8,A9	Adjust for maximum deflection.
7	.01 MFD	High side to Pin 8 (grid) 6SB7Y. Low side to chassis.	"	"	"	"	A10,A11	"
8	300Ω carbon resistor	High side to terminal D of ant. terminal strip. Low side to chassis.	92MC	"	92MC reference mark.	"	A12	"
9	"	"	106MC	"	106MC reference mark.	"	A13, A14	Adjust for maximum deflection. Repeat Steps 8 & 9 until no further improvement can be made. Continue with AM RF alignment.

FOR AM-RF AND ALTERNATE FM ALIGNMENT SEE PAGE 4

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc."

DATE 4/48-#488-27 SET #38-FOLDER #27

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		TEMPLE PART No.	STANDARD REPLACEMENT		
1	Converter	6SB7Y	6SB7Y	8R	
2	1st IF Amp.	12SG7	12SG7	8BK	
3	2nd IF Amp.	12SG7	12SG7	8BK	
4	FM Ratio Det.	7A6	7A6	7AJ	
5	AM Det.-AVC-AF	12SQ7GT	12SQ7GT	8Q	
6	Power Output	35L6GT	35L6GT	7AC	
7	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

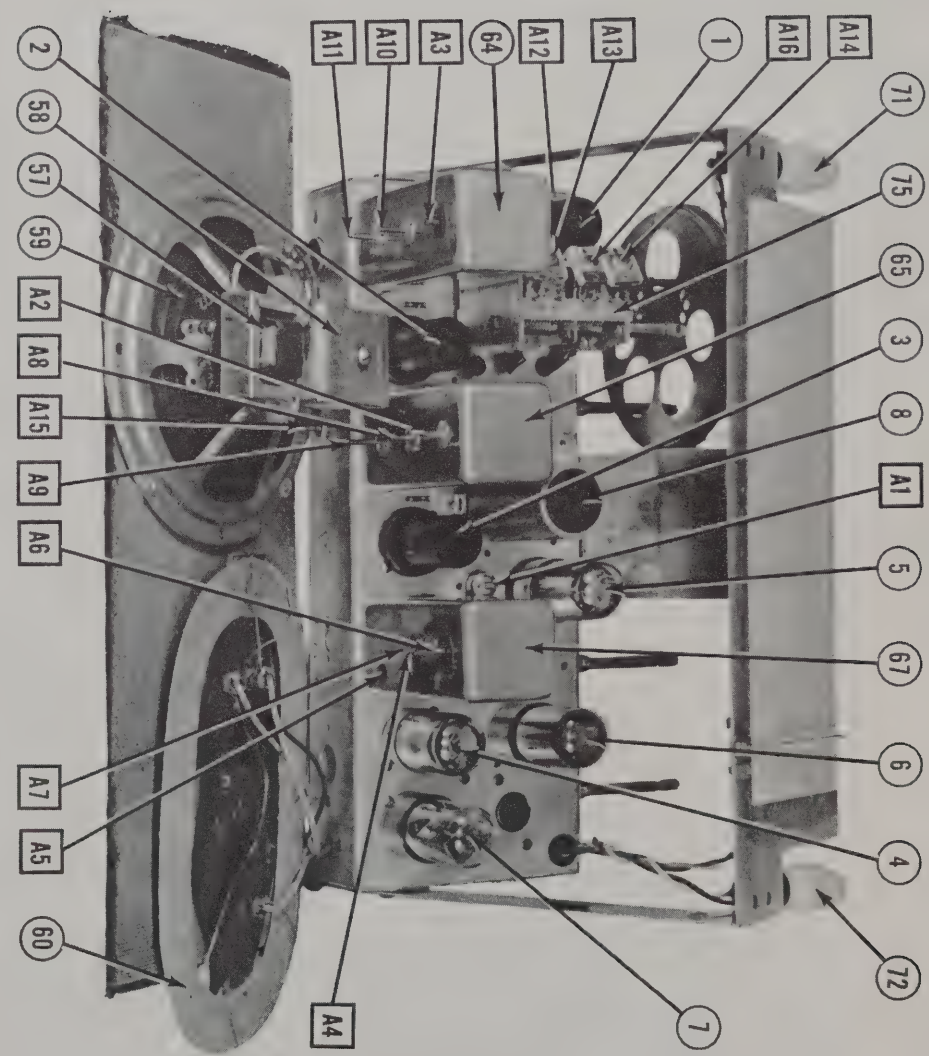
ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	TEMPLE PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
8A	100	150		TA-505	PRS150/50-50	UP55515C*	DSB804020-150	Filter-Red & Blk.
B	50	150		UT-501	PRS150/50			" -Blue & Grn.
9	4	450		UT-4	PRS450/4	BR445	M-4-450	Stabilizing Cap.
10	.1	400		TC-1	484-.1	DT4P1	ST-4-1	Line Filter
11	.01	600		TC-11	684-01	DT6S1	ST-6-01	Fil. Bypass
12	.1	600		TC-1	684-.1	DT6P1	ST-6-1	" "
13	.05	600		TC-15	684-05	DT6S5	ST-6-05	" "
14	.005	400		TC-25	484-005	DT6D5	ST-6-005	Output Plate Bypass
15	.02	600		TC-12	684-02	DT6S2	ST-6-02	Audio Coupling
16	.005	400		TC-25	484-005	DT6D5	ST-6-005	" "
17	.01	600		TC-11	684-01	DT6S1	ST-6-01	Tone Comp.
18	.01	600		TC-11	684-01	DT6S1	ST-6-01	RF Bypass
19	.01	600		TC-11	684-01	DT6S1	ST-6-01	2nd IF Screen Bypass
20	.01	600		TC-11	684-01	DT6S1	ST-6-01	1st IF Decoupling
21	.05	400		TC-15	484-05	DT4S5	ST-4-05	Conv. Decoupling
22	.05	600		TC-15	684-05	DT6S5	ST-6-05	AVC Filter
23	.01	600		TC-11	684-01	DT6S1	ST-6-01	Ext. Ant. Isolation
24	.003	600		TC-23	684-003	DT6D3	ST-6-003	Tone Comp.-See Note
25	220	500		1FM-325	1468-00025	5W5T25	MO.5-325	Diode Filter
26	22	500		MS-42	1468-000025	5W5Q25	MO.5-425	AM IF Coupling
27	2200	300						Fixed Trimmer
28	100	500		1FM-31	1468-0001	5W5T1	MO.5-31	Tone Comp.
29	1000	300		1FM-21	1468-001	1W5D1	MO.3-21	Diode Load Cap.
30	100	500		1FM-31	1468-0001	5W5T1	MO.5-31	Osc. Grid Cap.
31	220	500		1FM-325	1468-00025	5W5T25	MO.5-325	RF Bypass
32	220	500		1FM-325	1468-00025	5W5T25	MO.5-325	Fil. Bypass
33	33	500						Fixed Pad-Silver
34	10	500		MS-41	1468-00001	5W5Q1	MO.5-41	RF Coupling
35	820	300		MS-38	1468-00075	1W5T8	MO.3-38	RF Bypass-See Note
36	470	500		1FM-35	1468-0005	5W5T5	MO.5-35	" " " "
37	100	500		1FM-31	1468-0001	5W5T1	MO.5-31	Output Grid Bypass

Note-Not used in all models. * - Omit one section.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	TEMPLE PART No.	IRC PART No.	CLAROSTAT PART No.	
38	1 Meg.	½	RP11-105B			Volume Control & Sw. tapped @ 150KΩ and 300KΩ.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	TEMPLE PART No.	IRC PART No.	
39	22KΩ	½		BTS-22K	Red-Red-Or. Oscillator Grid
40	330Ω	1			Or.-Or.-Br. Converter Decoupling
41	1.2 Meg.	½		BTS-1.2 Meg.	Br.-Red-Grn. Bias Network-See Note 1
42	150Ω	½			Br.-Grn.-Br. 2nd IF Screen Decoup.
43	22KΩ	½		BTS-22K	Red-Red-Or. Ratio Detector Diode Load
44	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Tone Compensation
45	33KΩ	½		BTS-33K	Or.-Or.-Or. " "
46	33KΩ	½		BTS-33K	Or.-Or.-Or. " " - See Note 1
47	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
48	220KΩ	½		BTS-220K	Red-Red-Yl. Diode RF Filter
49	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Diode Load
50	5.6 Meg.	½		BTS-5.6 Meg.	Grn.-Blue-Grn. AF Grid-See Note 2
51	330KΩ	½		BTS-330K	Or.-Or.-Yl. AF Plate Load
52	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
53	680Ω	1		BTS-680	Blue-Gray-Br. Filter-See Note 3
54	47Ω	1		BW-1-47	Yl.-Vi.-Blk. Bias Network-See Note 4
55	150Ω	½			Br.-Grn.-Br. Filament Shunt-See Note 1
56	68Ω	1			Blue-Gray-Blk. " " - " " "

Note 1-Not used in all models.
Note 2-Some models use 4.7 Meg. in this application. IRC replacement BTS-4.7 Meg.
Note 3-Some models use two 330Ω in this application. Replacement same as above.
Note 4-Some models use 68Ω in this application. IRC replacement BW-1-68.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TEMPLE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No	
	PRI.	SEC.	PRI.	SEC.					
57	1650Ω	3.4Ω†	225Ω	.6Ω		A-3876	T22S45	A-2628	

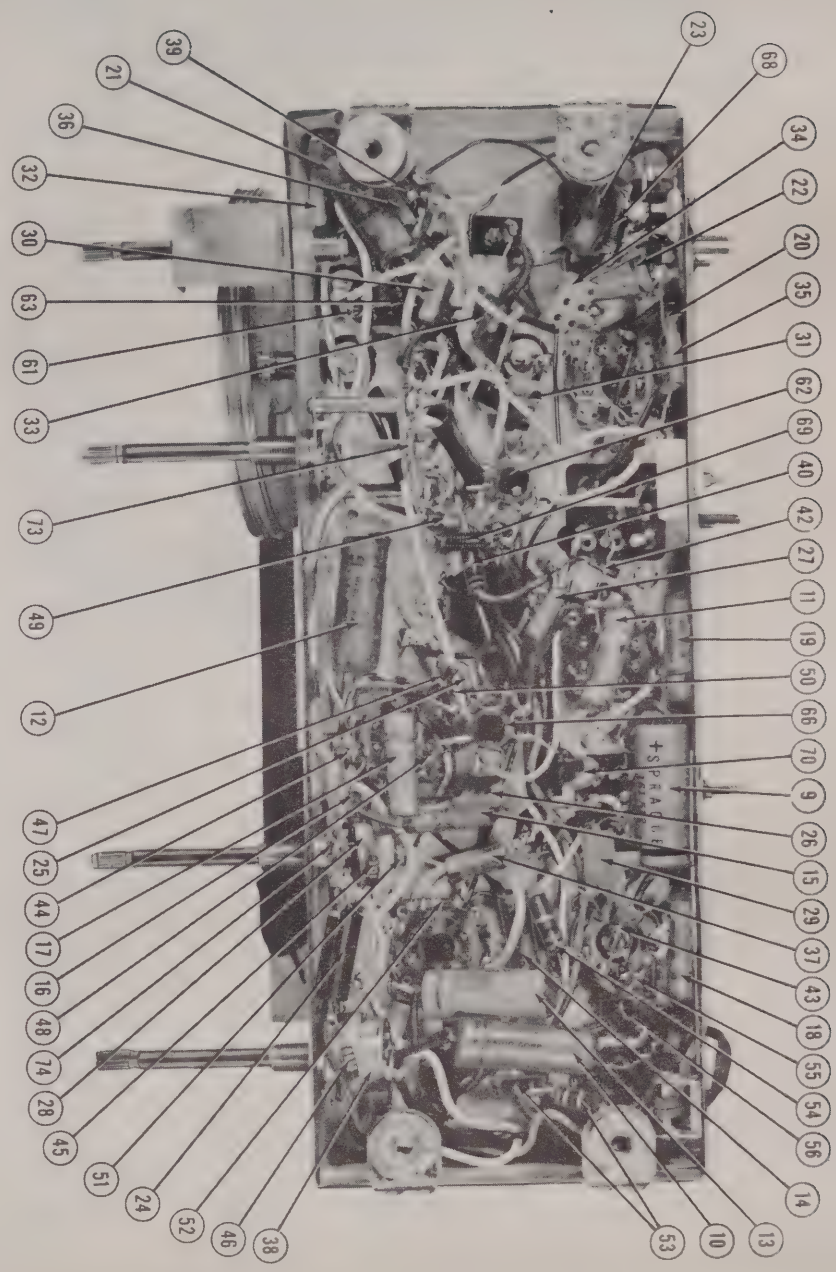
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TEMPLE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD RES.	VC IMP.		ST-110		
58	Ph	3.4Ω		Mod. P6-V	6A21	
	CONE DIA.	VC DIA.				
59	6"	1/2"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TEMPLE PART No.	MEISSNER PART No.	
60	Loop Ant.		.6Ω			
61	FM Ant.Coil		0Ω	LR17		
62	AM Osc.Coil	.5Ω	4.3Ω	LO14	14-1060	
63	FM " "		0Ω	LO13		
64A	AM 1st IF	.8Ω	Inf.	TM6		
B	FM 1st IF	.1Ω		TM15		†Includes both primaries.
65A	AM 2nd IF	.8Ω†				
B	FM 2nd IF		.1Ω			
66	AM 3rd IF		.8Ω	TM14		
67	Ratio Det.		.2Ω	TM5		
68	Wave Trap		0Ω	LF8		
69	" "			LF8		
70	IF Plate Choke		2.2Ω	LF9		

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA TEMPLE PART No.		INSTALLATION NOTES
71	Screw	120					Type C-7
72	"	"					" "

MISCELLANEOUS

ITEM No.	PART NAME	TEMPLE PART No.	NOTES
73	Switch	SR28	Band
74	"	SR25-2	Tone
75	2 Gan. Var. Cap.	CV15-1	(37-430MMF) each section

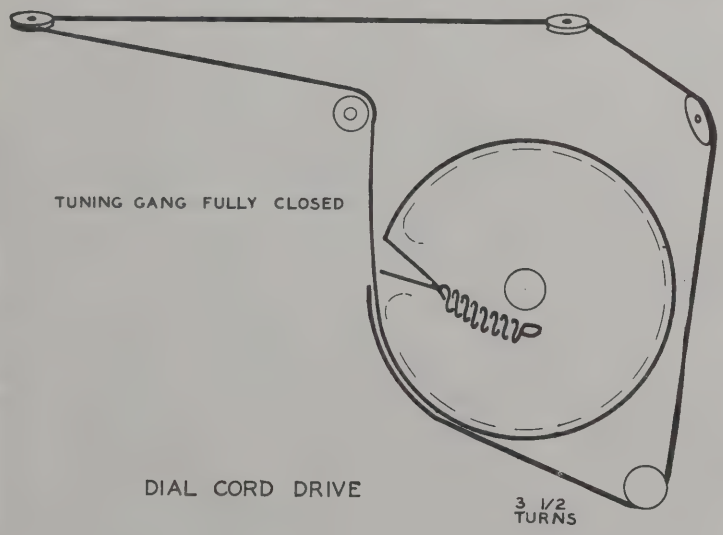


FIG. 1

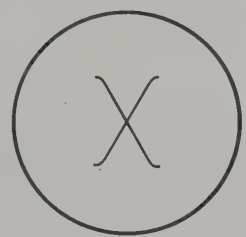


FIG. 2

DATE 4/48-#488-27 SST #488-FOLDER #27

FM ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal 450KC sweep with 60∿ modulation except in Step 3 where 225KC sweep is used. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
2	.01 MFD	High side to Pin 4 (grid) 12SG7 1st IF Tube (2). Low side to chassis.	10.7MC (freq. modulated	FM (counter clock-wise)	Tuning cap. fully open.	Vertical input to Point A Ground to chassis.	A4,A8, A9	Disconnect 5 MFD cap. from Point A. Adjust A4, A8, A9 for maximum amplitude, symmetry and coincidence of pattern per Figure 1.
3	.01 MFD	High side to Pin 8 (grid) 6SB7Y. Low side to chassis.	"	"	"	"	A10,A11	Adjust for maximum amplitude, symmetry & coincidence of pattern per Figure 1.
4	.01 MFD	High side to Pin 4 (grid) 12SG7 1st IF Tube (2). Low side to chassis.	10.7MC (freq. modulated 225KC sweep)	"	"	Vertical input to Point C Ground to chassis.	A5,A6, A7	Reconnect 5 MFD cap. to Point A. Alternately adjust A6 & A7 for peaks occurring about 200KC from center of pattern and A5 for maximum straightness of crossover lines with crossover occuring at center of pattern per Fig. 2.
5	300Ω carbon res.	High side to terminal D of ant. terminal strip. Low side to chassis.	92MC	"	92MC reference mark	Vertical input to Point A Ground to chassis.	A12	Disconnect 5 MFD cap. from Point A. Adjust A12 for coincidence of pattern per Fig. 1.
6	"	"	106MC	"	106MC reference mark.	"	A13, A14	Adjust A13 for coincidence, adjust A14 for maximum amplitude of pattern per Fig. 1. Repeat Steps 5 & 6 until no further improvement can be made. Reconnect 5 MFD cap. to Point A and continue with Am RF Alignment.

AM RF ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
10	100MMFD	High side to terminal A on ext. ant. terminal strip. Low side to chassis.	600KC	BC	600KC reference mark	Across voice coil	A15	Adjust for maximum output
11	100MMFD	"	1550KC	"	1550KC reference mark	"	A16	Adjust for maximum output Repeat Steps 10 & 11 until no further improvement can be made.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

VOLTAGE READINGS

	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
	1	6SB7Y	0V.	4VAC	87VDC	87VDC	-10VDC§	0V.	6.6VAC	-.3VDC
	2	12SG7	0V.	29VAC	0V.	-.5VDC	0V.	83VDC	41VAC	83VDC
‡	3	12SG7	0V.	16VAC	0V.	-.5VDC	0V.	92VDC	29VAC	92VDC
‡	4	7A6	13VAC	0V.	0V.	0V.	0V.	0V.	0V.	16VAC
	5	12SQ7GT	0V.	-.5VDC	0V.	0V.	-2.6VDC	55VDC	13VAC	4VAC
	6	35L6GT	0V.	41VAC	105VDC	92VDC	-2.5VDC	-.35VDC	77VAC	0V.
	7	35Z5GT	0V.	111VAC	105VAC	111VAC	111VAC	52VAC	77VAC	115VDC

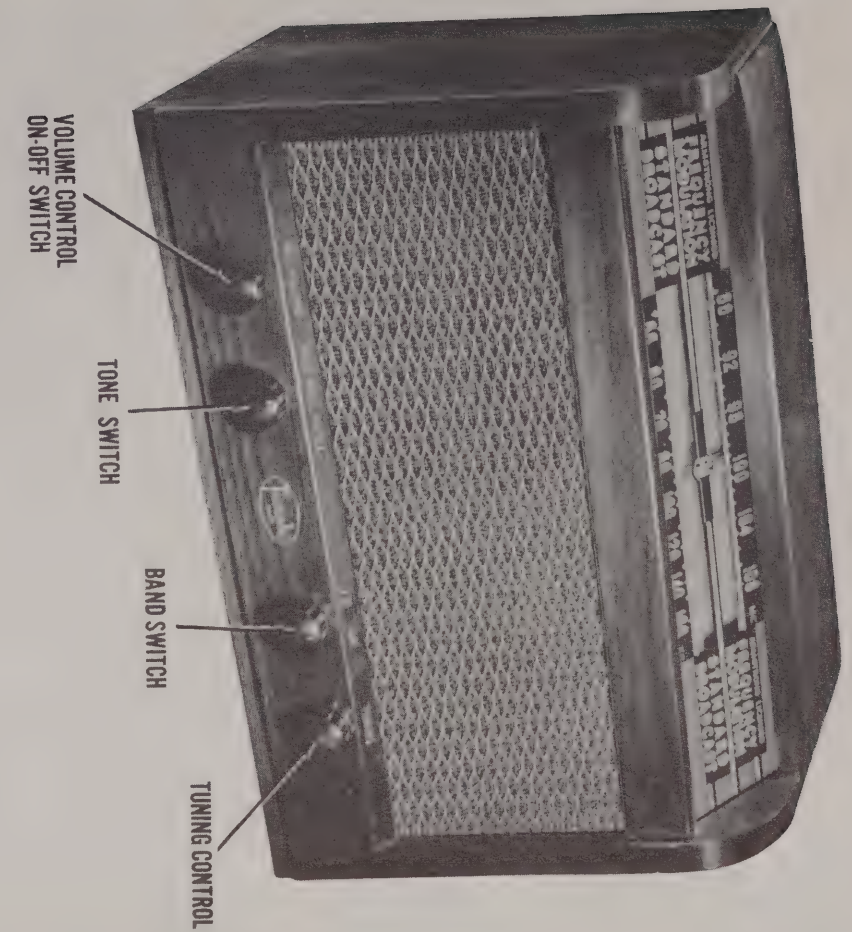
RESISTANCE READINGS

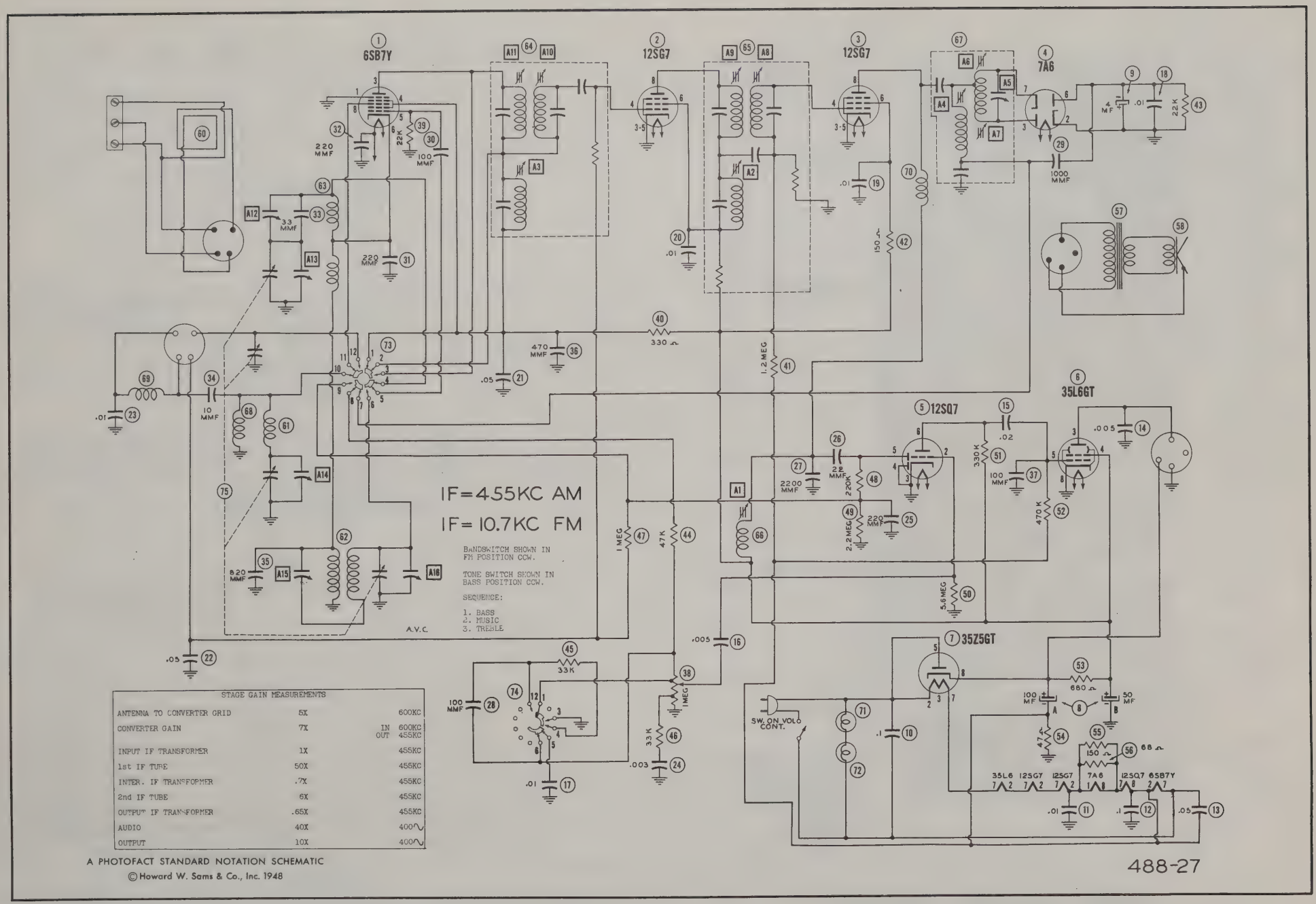
	Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
	1	6SB7Y	0Ω	46Ω	60KΩ	60KΩ	22KΩ	.5Ω	50Ω	2.2 Meg.
	2	12SG7	0Ω	75Ω	0Ω	2 Meg.	0Ω	60KΩ	85Ω	60KΩ
‡	3	12SG7	0Ω	62Ω	0Ω	340KΩ	0Ω	60KΩ	75Ω	60KΩ
‡	4	7A6	58Ω	0Ω	1 Meg.	INF.	0Ω	22KΩ	1 Meg.	62Ω
	5	12SQ7GT	0Ω	5 Meg.	0Ω	0Ω	1.2 Meg.	390KΩ	58Ω	46Ω
	6	35L6GT	INF.	85Ω	60KΩ	60KΩ	470KΩ	46Ω	115Ω	0Ω
	7	35Z5GT	INF.	135Ω	130Ω	135Ω	135Ω	170Ω	115Ω	60KΩ

§TAKEN WITH VACUUM TUBE VOLTMETER.

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.





STAGE GAIN MEASUREMENTS			
ANTENNA TO CONVERTER GRID	5X		600KC
CONVERTER GAIN	7X	IN OUT	600KC 455KC
INPUT IF TRANSFORMER	1X		455KC
1st IF TUBE	50X		455KC
INTER. IF TRANSFORMER	.7X		455KC
2nd IF TUBE	6X		455KC
OUTPUT IF TRANSFORMER	.65X		455KC
AUDIO	40X		400~
OUTPUT	10X		400~

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

488-27

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

TRUETONE MODEL D-2851

TRADE NAME	Truetone, Model D-2851
SUPPLIER	Western Auto Supply Corp., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	AC Operated Combination Phono-Radio Superheterodyne Receiver with Loop Antenna
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amp., 12AT6 Det.-AVC-AF, 50B5 Power Output, 35W4 Rectifier.
POWER SUPPLY	105-125 Volts AC
TUNING RANGE—BROADCAST	535-1620KC RATING .21 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

With tuning cores fully out right edge of tape should be set to right edge of calibration mark at extreme right end of tape guide. If the setting is off loosen screws holding two tape guide brackets on front of chassis. Lift tape guide up disengaging teeth on tape and position end of tape. Pull track down engaging teeth of tape and tighten bracket screws. Adjustment of pressure of tape teeth on tuning control gear should be made carefully to insure smooth motion of tuning control.

See sketch of cross section of IF transformer for special IF alignment tool.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1MFD	High side to pin 7 (Grid) 12BE6. Low side to B-.	455KC	Tuning cores fully out.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD. to reduce hum modulation. Peak top cores (A2,A4) above coils. Peak bottom cores (A1, A3) below coils. (See sketch on cross section of IF.)
2	.1 MFD.	High side to pin 7 (Grid) 12BE6. Low side to B-.	1620KC	Tuning cores fully out.	Across voice coil	A5	Adjust for maximum output.
3	200MMFD	High side to ext. ant. clip. Low side to B-.	535KC	Tuning cores fully in.	Across voice coil	A6	Adjust for maximum output.
4	200MMFD	High side to ext. ant. clip. Low side to B-.	1620KC	Tuning cores fully out	Across voice coil	A7	Adjust for maximum output.
5	200MMFD	High side to ext. ant. clip. Low side to B-.	1400KC	Tune for maximum output.	Across voice coil	A8	Adjust for maximum output. Repeat steps 4 & 5 until no further improvement can be made.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TRUETONE
MODEL D-2851

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		TRUETONE PART No.	STANDARD REPLACEMENT		
1	Converter	12BE6	12BE6	7CH	
2	IF Amp.	12BA6	12BA6	7BK	
3	Det.-AVC-AF	12AT6	12AT6	7BT	
4	Power Output	50B5	50B5	7BZ	
5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	TRUETONE PART No.	SPRAGUE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	
6A	40	150	A-8C-10077	EL-224	AF844D	UP42215	DY-403020-	■ Filter
B	20	150					150	▲ Filter
C	20	150						Filter
7	25	25	A-8C-11678	TA-25	PRS25-25	BR252A	M-25-25	Cathode Bypass
8	.05	400	C-8D-10813	TC-15	484-05	DT4S5	ST-4-05	Line Filter
9	.01	400	C-8D-10761	TC-11	484-01	DT4S1	ST-4-01	Output Plate Bypass
10	.006	600	C-8D-12243	TC-26	684-006	DT6D6	ST-6-006	Tone Compensation
11	.01	400	C-8D-10761	TC-11	484-01	DT4S1	ST-4-01	Audio Coupling
12	.01	400	C-8D-10761	TC-11	484-01	DT4S1	ST-4-01	" "
13	.1	200	C-8D-10771	TC-1	484-1	DT2P1	ST-2-1	RF Bypass Pwr Supply
14	.09	400	C-8D-11251	TC-1	484-1	DT2P1	ST-2-1	Line Isolation
15	.05	200	C-8D-10770	TC-15	484-05	DT2S5	ST-4-05	AVC Filter
16	220	500	C-8F3-10	1FM-325	1468-00025	5W5T25	MO.5-325	AF Plate Bypass
17	220	500	C-8F3-10	1FM-325	1468-00025	5W5T25	MO.5-325	Diode RF Filter
18	47	500	C-8G-12198	1FM-45	1468-00005	5W5Q5	MO.5-45	Osc. Grid Cap.- Cer.
19	820	300	C-8F3-124	1FM-37	1468-00075	1W5T8	MO.3-38	Ext. Ant. Isolation

CONTROLS

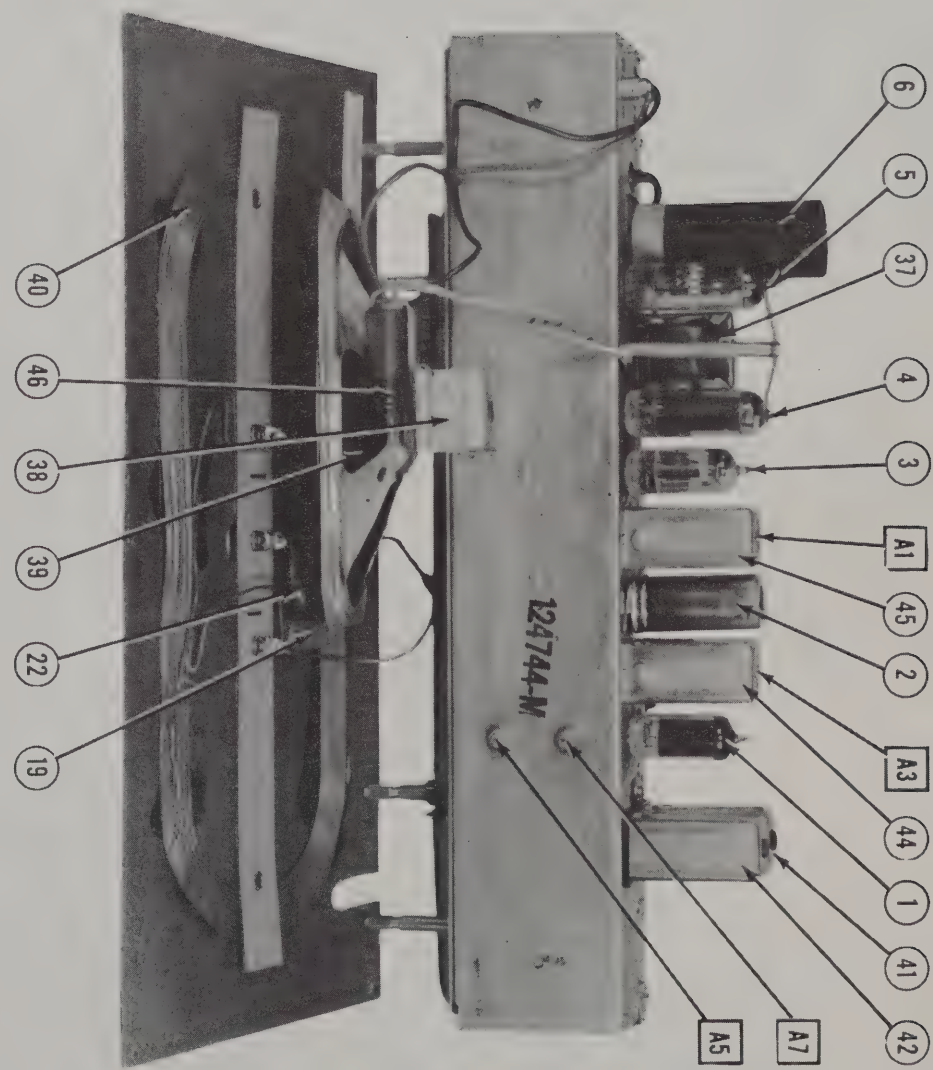
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	
20A	1 Meg.	½	A-10A-12654	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 20A per instructions.
C	Switch		Not Req.	41	SW-A	" " " " "
21A	1 Meg.	½	A-11B-12659	D13-137	AM-63-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 21A per instructions.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	
22	1000Ω	½	C-9B1-62	BTS-1000	Br.-Blk.-Red Series Antenna
23	22KΩ	½	C-9B1-78	BTS-22K	Red-Red-Or. Oscillator Grid
24	270kΩ	½	C-9B1-91	BTS-270K	Red-Vi.-Yl. Line Isolation
25	56Ω	½	C-9B1-47	BW-½-56	Grn.-Blue-Blk. IF Cathode
26	3.3 Meg.	½	C-9B1-34	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
27	6.8 Meg.	½	C-9B1-36	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
28	100KΩ	½	C-9B1-86	BTS-100K	Br.-Blk.-Yl.AF Plate Load
29	560KΩ	½	C-9B1-95	BTS-560K	Grn.-Blue-Yl. Output Grid
30	150Ω	½	C-9B1-52	BW-½-150	Br.-Grn.-Br. Output Cathode
31	1200Ω	1	C-9B2-63	BTA-1200	Br.-Red-Red Filter
32	220Ω	1	C-9B2-54	BW-1-220	Red-Red-Br. "
33	27Ω	1		BW-1-27	Red-Vi.-Blk. Surge Limiter
34	33Ω	1	C-9B2-44	BW-1-33	Or.-Or.-Blk. Line Dropping - See Note
35	560KΩ	½	C-9B1-95	BTS-560K	Grn.-Blue-Yl. Series Phono
36	100KΩ	½	C-9B1-86	BTS-100K	Br.-Blk-Yl. Diode RF Filter - See Note

Note: Not used in all models.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TRUETONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
37	2200Ω	3.2Ω	310Ω	.7Ω	B-12C-12356			A-2998†	†Remove frame of original and use with replacement.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TRUETONE PART No.	JENSEN PART No.	QUAM PART No.	
38	FIELD PM	VC IMP. 3.2Ω	B-18A-13369		46A1*	* Fabricate new mounting bracket.
39	CONE DIA. 4"X6"	VC DIA. $\frac{1}{2}$"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	TRUETONE PART No.	MEISSNER PART No.
40	Loop Ant.		.7Ω	C-13E-13305-1	
41	Ant.Coil		13Ω	A-13E-12668	
42	Osc.Coil		7Ω	A-23D-12667	
43	Osc.Shunt-Coil	1.5Ω	15Ω	B-13D-12371	
44	Input IF	18Ω	17Ω	B-13A-13071	16-6678
45	Output IF	24Ω	28Ω	B-13B-13072	16-6678

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					TRUETONE PART No.		
46	Bayonet	6-8V	0.15A	Brown	A-46A-10793		Type 47

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA		REMARKS
	TRUETONE PART No.	ASTATIC PART No.	
47		L-70-A	L-70 original part

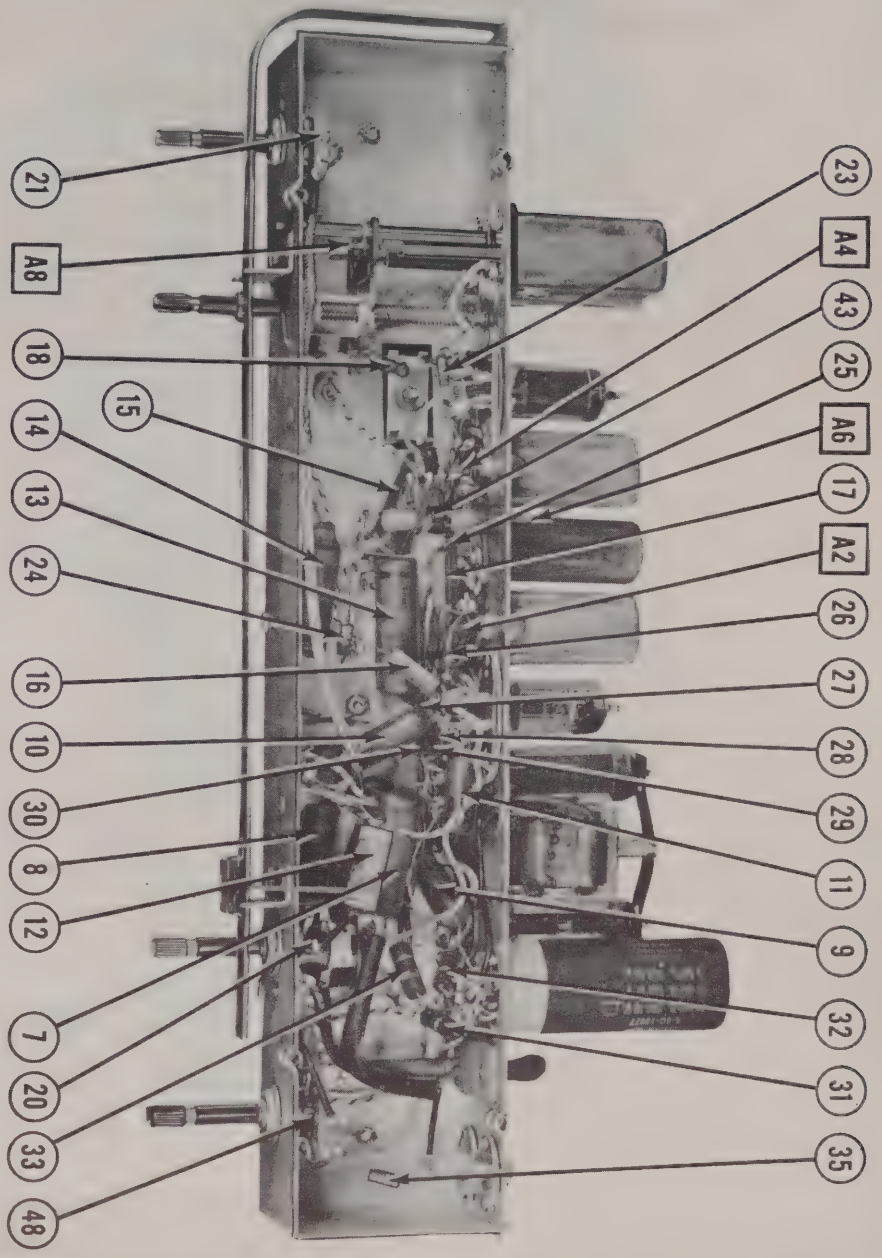
MISCELLANEOUS

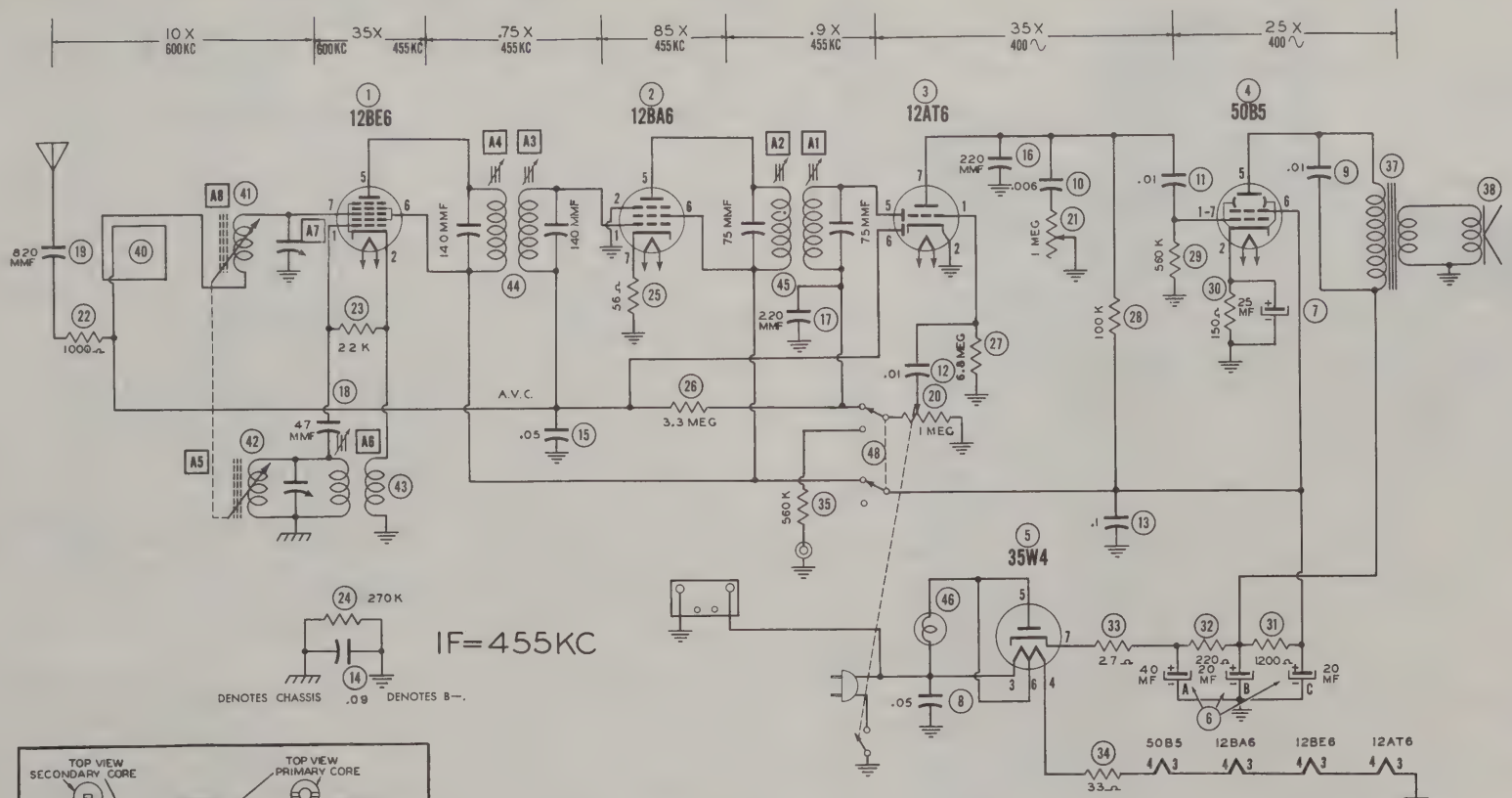
ITEM No.	PART NAME	TRUETONE PART No.	NOTES
48	Switch	A-20A-12653	Radio-Phono
	Dial Scale	B-30A-13408	
	Pointer	A-2G-13404	
	Knob	B-5B-13391	

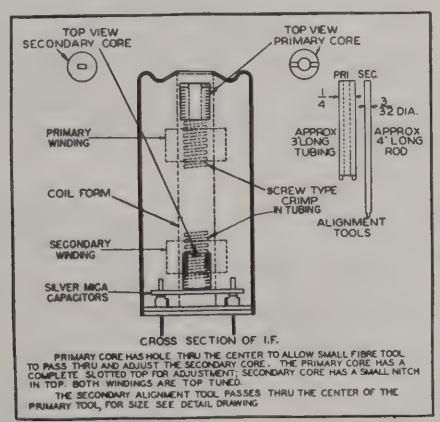
DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove phono-motor plug from chassis.
3. Remove phono-pickup plug from chassis.
4. Remove loop antenna plug from chassis.
5. Remove four Phillips head screws holding plastic dial plate to cabinet. Remove dial plate from cabinet.
6. Remove two hex head screws holding chassis in cabinet. Remove chassis from cabinet.

CHASSIS—BOTTOM VIEW






TOP VIEW SECONDARY CORE
TOP VIEW PRIMARY CORE
PRI SEC.
PRIMARY WINDING
COIL FORM
SECONDARY WINDING
SILVER MICA CAPACITORS
SCREW TYPE CRIMP IN TUBING
ALIGNMENT TOOLS
APPROX 3 LONG TUBING
APPROX 4 LONG ROD
CROSS SECTION OF I.F.
PRIMARY CORE HAS HOLE THRU THE CENTER TO ALLOW SMALL FIBRE TOOL TO PASS THRU AND ADJUST THE SECONDARY CORE. THE PRIMARY CORE HAS A COMPLETE SLOTTED TOP FOR ADJUSTMENT; SECONDARY CORE HAS A SMALL NITCH IN TOP. BOTH WINDINGS ARE TOP TUNED.
THE SECONDARY ALIGNMENT TOOL PASSES THRU THE CENTER OF THE PRIMARY TOOL, FOR SIZE SEE DETAIL DRAWING

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	-5VDC§	0V.	12VAC	24VAC	85VDC	85VDC	-.6VDC
2	12BA6	-.6VDC	0V.	24VAC	37VAC	85VDC	85VDC	15VDC
3	12AT6	-.5VDC	0V.	0V.	12VAC	0V.	-.6VDC	-.5VDC
4	50B5	0V.	5.3VDC	37VAC	86VAC	97VDC	85VDC	0V.
5	35W4	0V.	0V.	86VAC	117VAC	114VAC	114VAC	122VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	12BE6	22KΩ	1.5Ω	12Ω	23Ω	100KΩ	100KΩ	4.3 Meg.
2	12BA6	4.3 Meg.	0Ω	23Ω	36Ω	100KΩ	100KΩ	56Ω
3	12AT6	6.8 Meg.	0Ω	0Ω	12Ω	1 Meg.	4.3 Meg.	200KΩ
4	50B5	560KΩ	140Ω	36Ω	85Ω	100KΩ	100KΩ	560KΩ
5	35W4	INF.	INF.	85Ω	115Ω	110Ω	110Ω	1.0KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

488-28

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

TOP VIEW

MILWAUKEE 11200 SERIES
RECORD CHANGER

MILWAUKEE 11200 SERIES
RECORD CHANGER

GENERAL INFORMATION

The Model 11200 automatic record changer is a precision-built, gearless and beltless mechanism, designed to play automatically twelve 10-inch records or ten 12-inch records, not intermixed. The last record will be repeated until the changer is turned off. This changer is a single knob controlled mechanism, providing Off, Manual, Automatic, and Reject operations. Any record may be rejected while playing by turning the control knob to Reject momentarily. Manual operation is provided for single records, home recordings, or odd-size records.

This changer is designed to operate on 117-volt, 60-cycle alternating current unless otherwise specified on motor.

Manufactured by

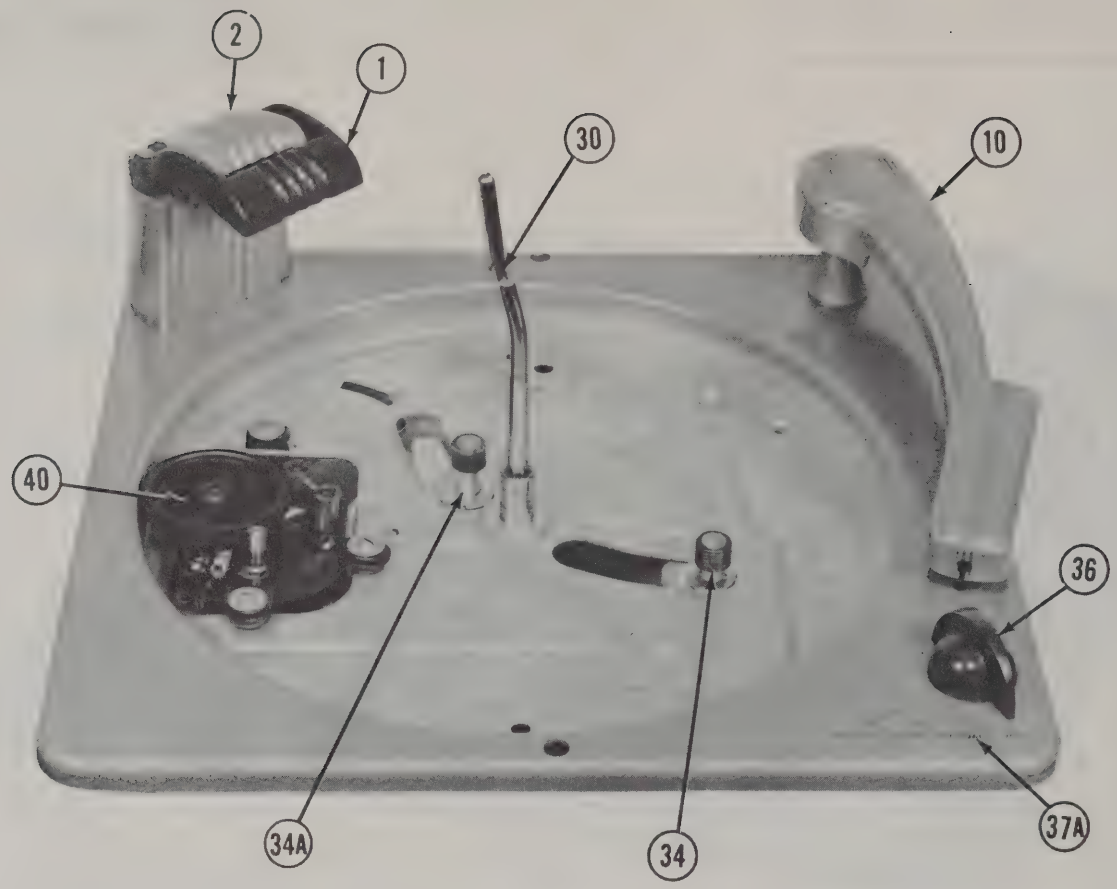
MILWAUKEE STAMPING COMPANY

Milwaukee 14, Wisconsin

THIS MATERIAL COMPILED AND PUBLISHED BY

HOWARD W. SAMS & CO., INC., INDIANAPOLIS INDIANA

COPYRIGHT 1948 • ALL RIGHTS RESERVED



TOP VIEW—TURNTABLE REMOVED

AUTOMATIC OPERATION

1. Be sure the pickup arm (10) is on the pickup arm rest (35).

2. Raise the balance arm (1) to a vertical position.

3. For 10-inch records, lower the hinged 10-inch record support (2) to its rest position on the ejector box (8). For 12-inch records, raise the 10-inch record support to a vertical position.

4. Place a stack of records, not to exceed twelve 10-inch records or ten 12-inch records, not intermixed, over the center post. The records will now rest on the step on the center post and on either the ears of the ejector box on the ledge of the 10-inch record support, depending on the size of records being used and position of 10" record support.

5. Lower the balance arm (1) to the records; this steadies the records and assures correct dropping of records.

6. Turn the control button (36) momentarily to the "Reject" position and release it. This turns the changer on and starts the change cycle, thus dropping the first record to the turntable.

7. To reject a record being played, turn the control knob to "Reject" and release it.

8. To discontinue operation, all records should be dropped to the turntable by repeatedly turning the control button to the Reject position until all unplayed records have dropped to the turntable. Place the pickup arm on the pickup arm rest and turn the control button to the "Off" position.

9. To remove the records from the turntable:
   (a) Raise the balance Arm (1) and the 10-inch record support upward, if the record support is in a horizontal position, to permit easy removal of records.
   (b) Lift the records from the turntable.

MANUAL OPERATION

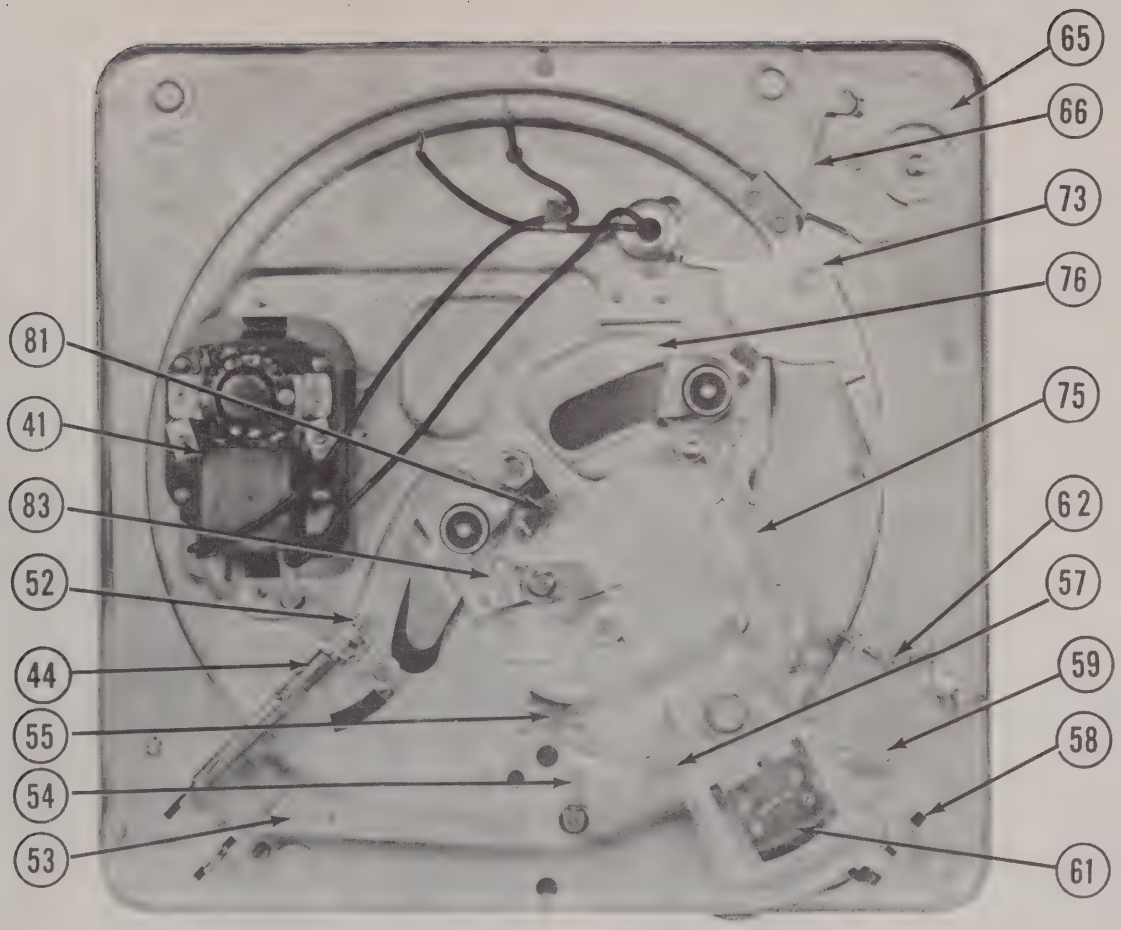
1. Raise the balance arm (1) and the hinged 10-inch record support (2) to a vertical position.

2. Place a record on the turntable.

3. Turn the control button to the "Manual" position. This action starts the rotation of the turntable. The position of the selector lever (73) blocks the movement of the lead bearing pin (34), thus preventing the changer from cycling.

4. Place the pickup arm on the lead-in groove at the edge of the record.

5. When the record has finished playing, return the



BOTTOM VIEW

pickup arm to the arm rest and turn the control button to the "Off" position.

THE CHANGE CYCLE

The change cycle may be started by turning the control button (36) to "Reject." The selector lever (73) then, being pivoted through the action of the notched washer, moves against the lead roller dropping lever (75), causing the flange of the dropping lever to be pivoted away from the top of the lead roller shoulder nut. This allows the lead roller bearing pin (34) to rise through the action of the compression spring (74) and to enter the spiral of the turntable, thus starting the change cycle.

As the lead roller of the swing arm follows the spiral on the underside of the turntable, the swing arm (64) cam engages the plunger pin (13), thus raising the pickup arm.

The ratchet arm friction spring (61) engages the ratchet arm (57), swinging the pickup arm out to a position where it is stopped by the ratchet arm contacting the stop bracket (91). The swing arm now pushes against the cam roller of the ejector idler lever (49), which, in turn, moves the lower push pin (44), the ejector lever (27), and the 12-inch record slide bolt (9), thus pushing a 12-inch record off the record shelf.

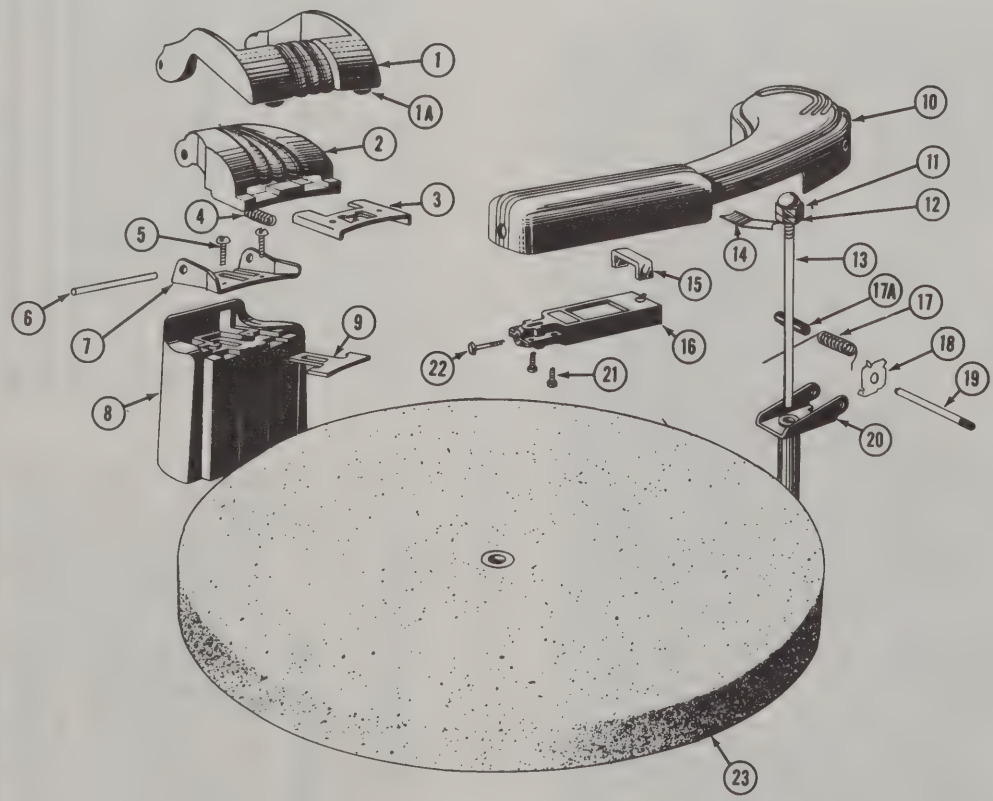
When 10-inch records are being played, the 12-inch record slide moves forward pushing the 10-inch record slide bolt (3), thus dropping a 10-inch to the turntable.

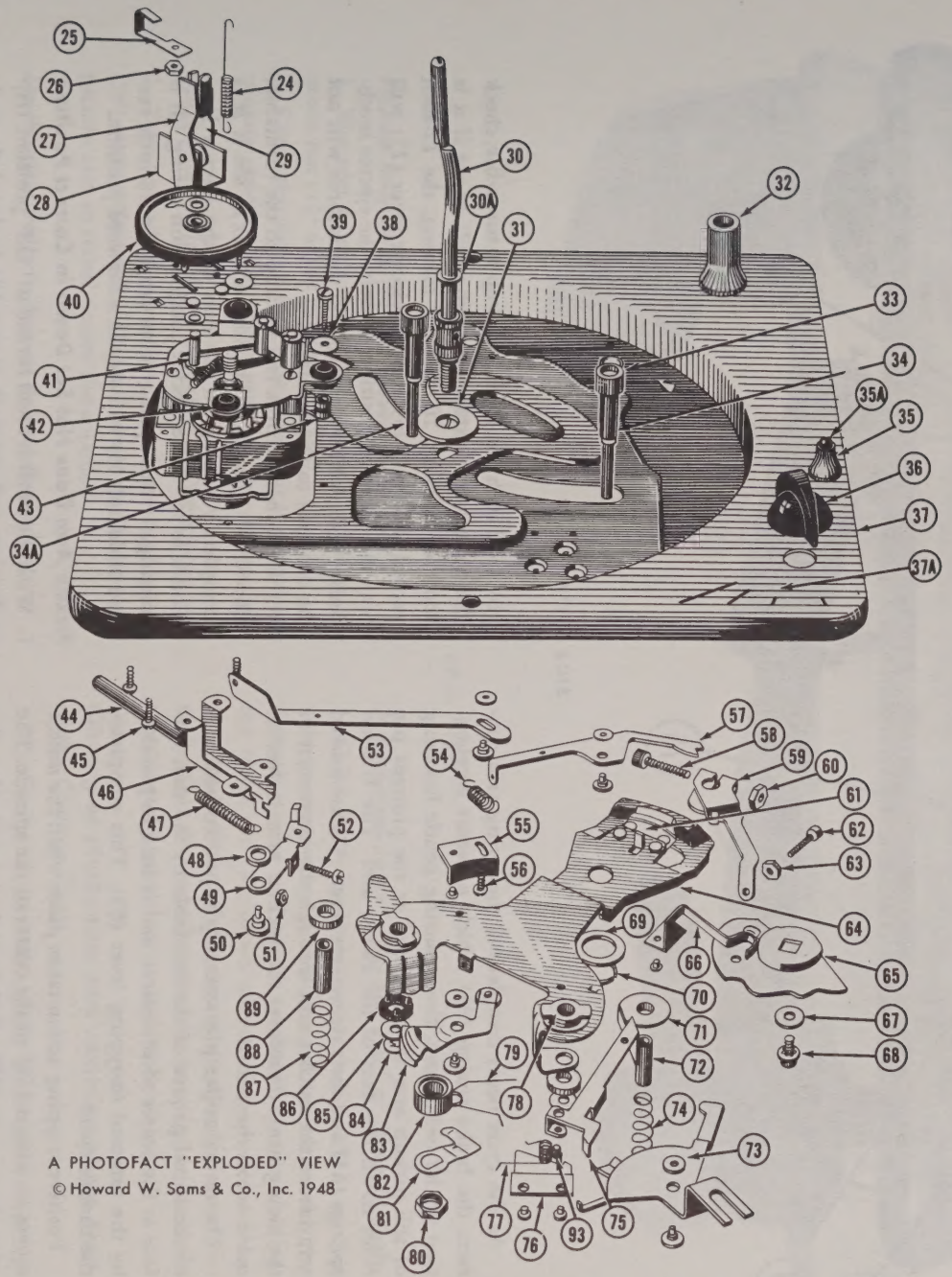
As the swing arm nears the end of its swing, the cammed dropping lever (83) comes in contact with the lever trip bracket (55), allowing the return roller pin (34C) to rise and enter the spiral groove.

The lead roller pin assembly is pushed back out of the spiral groove of the turntable by the cam surface at the center of the spiral and is held in position by the flange of the lead roller dropping lever (75). The swing arm is now moved back as the return roller follows the spiral.

The ejector assembly is now returned to its original position.

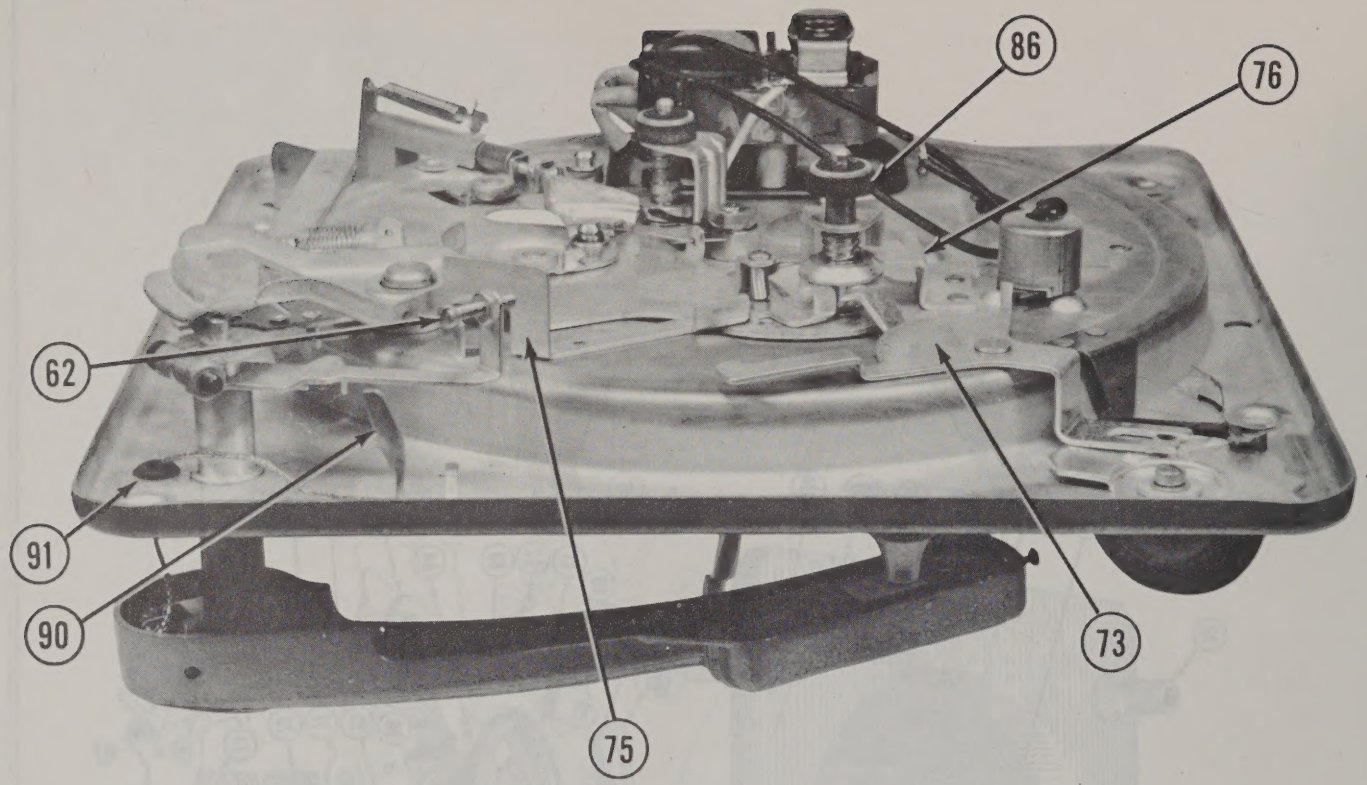
The pickup arm is moved back toward the record for set down by the friction springs (61). The pickup arm is stopped in proper position by the engagement of the ratchet arm (59) and the ratchet arm lever (57). The position of the ratchet arm lever is determined by the change lever (53) and the change lever ejector (29), which are operated by the 10-inch record support (2).


1
1A
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
17A
18
19
20
21
22
23



A PHOTOFACT "EXPLODED" VIEW

© Howard W. Sams & Co., Inc. 1948



SIDE VIEW

As the cycle nears completion, the swing arm contacts the brake spring (81) which prevents acceleration of the swing arm, thus assuring gentle lowering of the pickup arm to the record as the plunger pin rides down the cam of the swing arm. The friction springs (61) and the ratchet arm lever (57) are moved away from the ratchet arm through the movement of the swing arm; therefore, the pickup arm is free to move across the record.

The return roller pin assembly is pushed back out of the spiral groove of the turntable by the cam surface at the center of the spiral, and is held in position by the cammed dropping lever (83). This completes the change cycle.

Positive tripping action takes place when the needle moves to within 1⅞" of the center of the spindle. The adjusting screw (62) of the ratchet arm strikes the dropping lever (75) and moves it, thus starting a new change cycle.

SERVICE PROCEDURES

Records Fail to Drop

1. Trip the changer and rotate the turntable by hand until the swing arm (64) completes the first half of the cycle:

(a) Adjust screw (52) until the 12-inch record slide bolt (9) extends 1/32" past the ears of the ejector box.

(b) If 12-inch records fail to drop to turntable, check the ejector arm extension spring (47) to see if it is loose or missing. If loose, or missing, the 12-inch record slide bolt (9) and the ejector lever (27) will stay in a forward position; thereby the ejector mechanism will not be actuated and the records will not be dropped to the turntable.

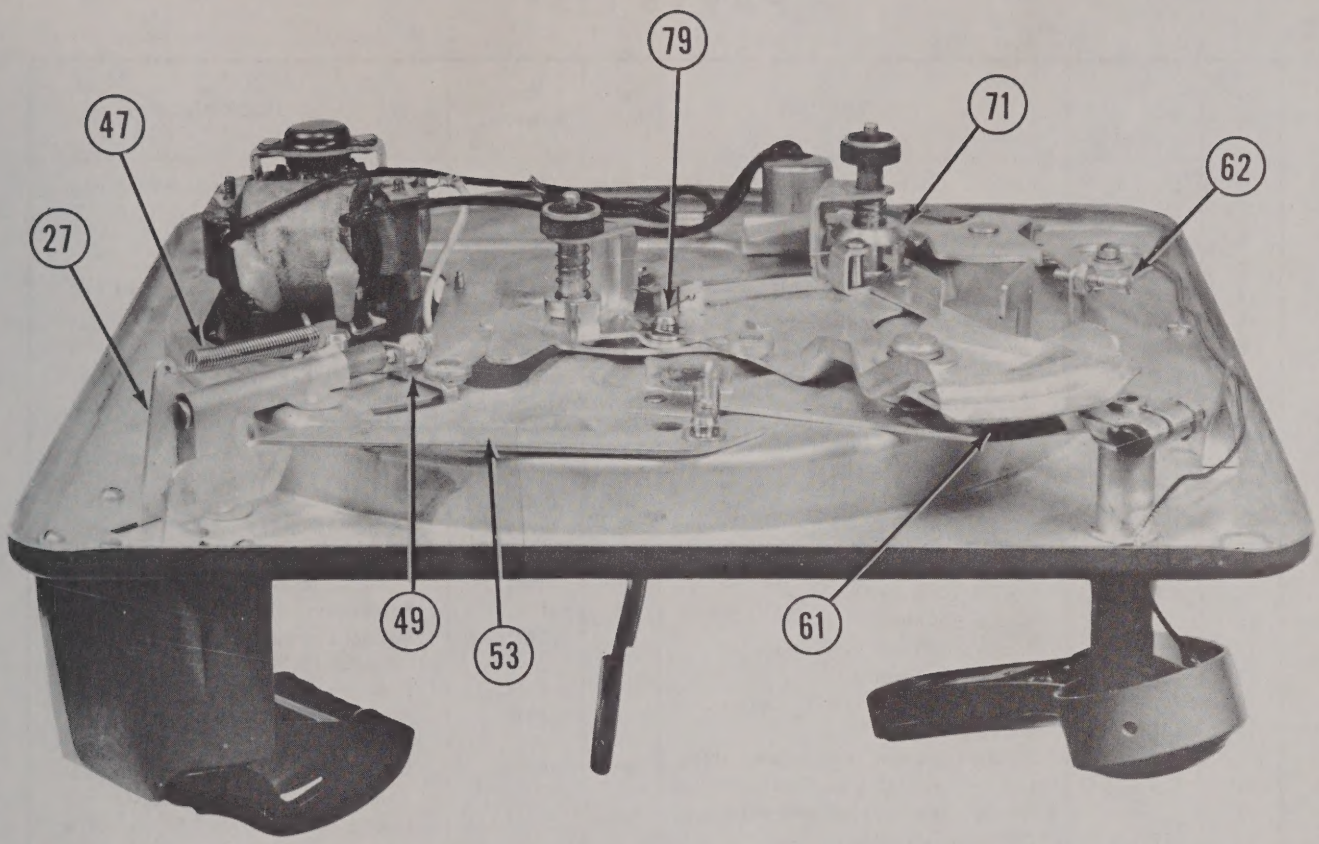
(c) If 10-inch records fail to drop to the turntable, check the 10-inch record support (2) to see if it is completely resting on the ears of the ejector box. Check to see if the ejector compression spring (4) is missing. If this spring is missing, the 10-inch record slide bolt (3) will stay in a forward position.

Pickup Arm Does Not Set Down in Correct Position

1. With the control knob turned to "Off" position, trip mechanism and rotate the turntable by hand through the cycle; note where the needle lands. Correction may be made by loosening the clamp screw (57) and moving the pickup arm slightly with respect to the ratchet arm (59). The needle should land approximately ⅛" from the edge of the record.
2. Check spring (54) to see if it is missing or too weak to actuate ratchet arm lever (57).

Pickup Arm Drops Fast When Setting Needle on Record

1. Check the friction brake spring (81); may be weak or broken.



REAR VIEW

Pickup Arm Does Not Set Down on Record

1. The pickup arm height adjustment is made by the acorn nut (11) of the plunger pin (13).
2. Check the pickup lead wire to see if it is clear of the contact point of the pickup arm and the plunger pin.

Mechanism Trips Before Record Is Completed

1. Turn the adjusting screw (62) of the ratchet arm (59) counterclockwise. This adjustment will allow the pickup arm to travel nearer the spindle.

Mechanism Fails to Trip at End of Record

1. Check adjusting screw (62) to see if it is making contact with the lead roller dropping lever (75). This screw should be adjusted so that when the pickup arm comes within 1⅞" of the center of the record the mechanism will be tripped.

2. Check the compression spring (74). It may be too weak to actuate the lead roller bearing pin assembly, and may not raise it sufficiently to enter the spiral of the turntable. If this is true, the mechanism will not operate when the control button is turned to Reject.
3. If pickup arm jumps groove in record before tripping, check for tightening of drop lever (75) on washer (71).

Mechanism Jams in Second Half of Change Cycle

1. Check dropping lever torsion spring (77) to see if it is loose or missing. If this spring is not connected, the dropping lever will not be actuated, thus not holding the roller pin (34) down when it is pushed down by the cam surface at the center of the spiral of the turntable. This allows both rollers in the spiral at the same time, thereby jamming the mechanism.

Clicking of Mechanism and Jamming at the Start of the Change Cycle

1. Check the cammed dropping lever torsion spring (79) to see if it is loose or broken. This will allow both bearing pins to stay in a raised position.

Continuous Cycling

1. Check the selector lever spring (66) to see if it is broken or bent.

Changer Does Not Complete Change Cycle but Turntable Continues to Rotate

1. Check the compression spring (87). If spring is too weak to raise the bearing pin (34C), the swing arm will not return to its proper position, thus leaving the pickup arm in an outward and raised position.

PARTS LIST

Ref. No.	Part No.	DESCRIPTION
1	11212-A	Balance arm assembly including (1A)
1A	11211	Rubber bumpers (part of 1)
2	11213	10" record support
3	11214	10" record slide bolt
4	11215	Ejector compression spring
5	11232	4-40 x 3/8" R.H. machine screw
6	11223	Hinge pin
7	11209	Slide bolt cover
8	11208	Ejector box
9	11217	12" record slide bolt
10	10752	Pickup arm
11	10762	Acorn nut for pickup arm
12	10810	10-32 bearing pin jam nut
13	10757	Adjusting plunger pin
14	10754	Spring clip
15	10846	Viscoloy strip for cartridge
16	10753	Pickup cartridge
17	10764	Spring for pickup arm balance
17A	10763	Balance spring tube
18	10766	Ratchet for pickup arm
19	10798	Pin for pivot yoke
20	10755-CA	Pickup arm swing post sub-assembly
21	10834	4-40 x 1/4" fastening screw for cartridge
22		Needle screw supplied with cartridge
23	11202-A	Turntable sub-assembly
24	11210	Balance arm spring
25	11220	Ejector pressure spring
26	11241	4-40 hex nut
27	11218	Ejector lever (part of 28)
28	11219-A	Ejector pivot channel sub-assembly including (27) and (29)
29	11222	Change lever, ejector (part of 28)
30	11250-A	Center-post assembly
30A	10823-C	Friction spring washer
31	10828	Reenforcement washer
32	11230	Pickup arm mounting post (part of 37)
33	11248	Roller (part of 34 and 34A)
34	10743	Bearing pin (lead roller) assembly including (33)
34A	10743	Bearing pin (return roller) assembly including (33)
35	11245	Pickup arm rest (part of 37)
35A	11224	Arm rest bumper (part of 37)
36	11203	Control button
37	11201A	Mechanism plate sub-assembly, including (32, 35, 46, 91)
37A	11247	Decal
38		Flat washer
39	10827	6 x 5/8 SM motor mounting screw
40		Idler wheel (part of 41)
41	11227A	Motor and switch assembly
	10825	Phonomotor
	11243	Switch
42		Motor mounting grommet
43		Motor mounting spacers
44	10804	Lower push pin
45	10831	6-32 x 3/8 thd. cutting machine screw
46	10724	Ejector pin guide (part of 37)
47	10728	Ejector arm extension spring
48	10782	Lever bearing washer
49	10813-A	Ejector idler lever sub-assembly, Including (51 and 52)
50	10781	Lever fulcrum pin
51		Lock nut (part of 52)
52	10792	6-32 x 5/8" adjusting screw and nut including (51)
53	11236	Change lever
	10805	Slide washer
	10787	Lever fulcrum pin
54	11235	Ratchet arm lever spring
55	10811	Lever trip bracket
		2 1/2/16" No. 2436 tubular rivet
56	10831	6-32 x 3/8" thd. cutting machine screw
57	11234	Ratchet arm lever
	10773	Change lever fulcrum pin
58	10837	1" x 10-32 socket head cap screw
59	11237	Ratchet arm
	11237A	Ratchet arm sub-assembly, including (58, 59, 60, 62, 63)
60	10810	10-32 hex nut
61	10735	Ratchet arm friction spring
	10791	Ratchet arm friction spring
62	10792	5/8" x 6-32 fillister hd. machine screw and hex nut, including (63)
63		Hex nut (part of 62)
64	11229	Swing arm
	11229-A	Swing arm sub-assembly including (ref. Nos. 33, 34, 71, 72, 74, 75, 78, 79, 83, 84, 85, 86, 87, 88, and 89)
65	11225	Notched washer
66	11226	Selector lever spring
		2/16" 2436 tubular rivet
67	10801	Fulcrum bearing washer
68	10848	10-32 x 3/8" sems screw
69	11239	33/64" I.D. x 7/8" O.D. x .060" flat washer
70	11240	XSC retaining ring
71	11242	Lead roller shoulder nut
72	10751	Bearing pin spacer
73	11205	Selector lever
74	10750	Compression spring
75	11231	Lead roller drop lever
76	11228	Lead roller release
		2 1/2/16" 2436 tubular rivet
77	11233	Drop lever torsion spring
78	10745	Swing arm clamp
79	10733	Cammed dropping lever torsion spring
80	10830-A	5/16"-24 center stud jam nut
81	10741	Friction brake spring
82	10736	Spacer collar for center post
83	10730-A	Cammed dropping lever assembly
	10787	Kickoff lever fulcrum pin
84	10765	Roller bearing speed nut
85	10801	Fulcrum bearing washer
86	11244	Roller cushion
87	10750	Compression spring
88	10751	Bearing pin spacer
89	10742	Bearing pin shoulder nut
90	10843	Ratchet arm stop bracket (part of 37)
91	10850	Grommet for pickup leads
92	10845	Mounting springs
93	11206	Dropping lever pivot pin